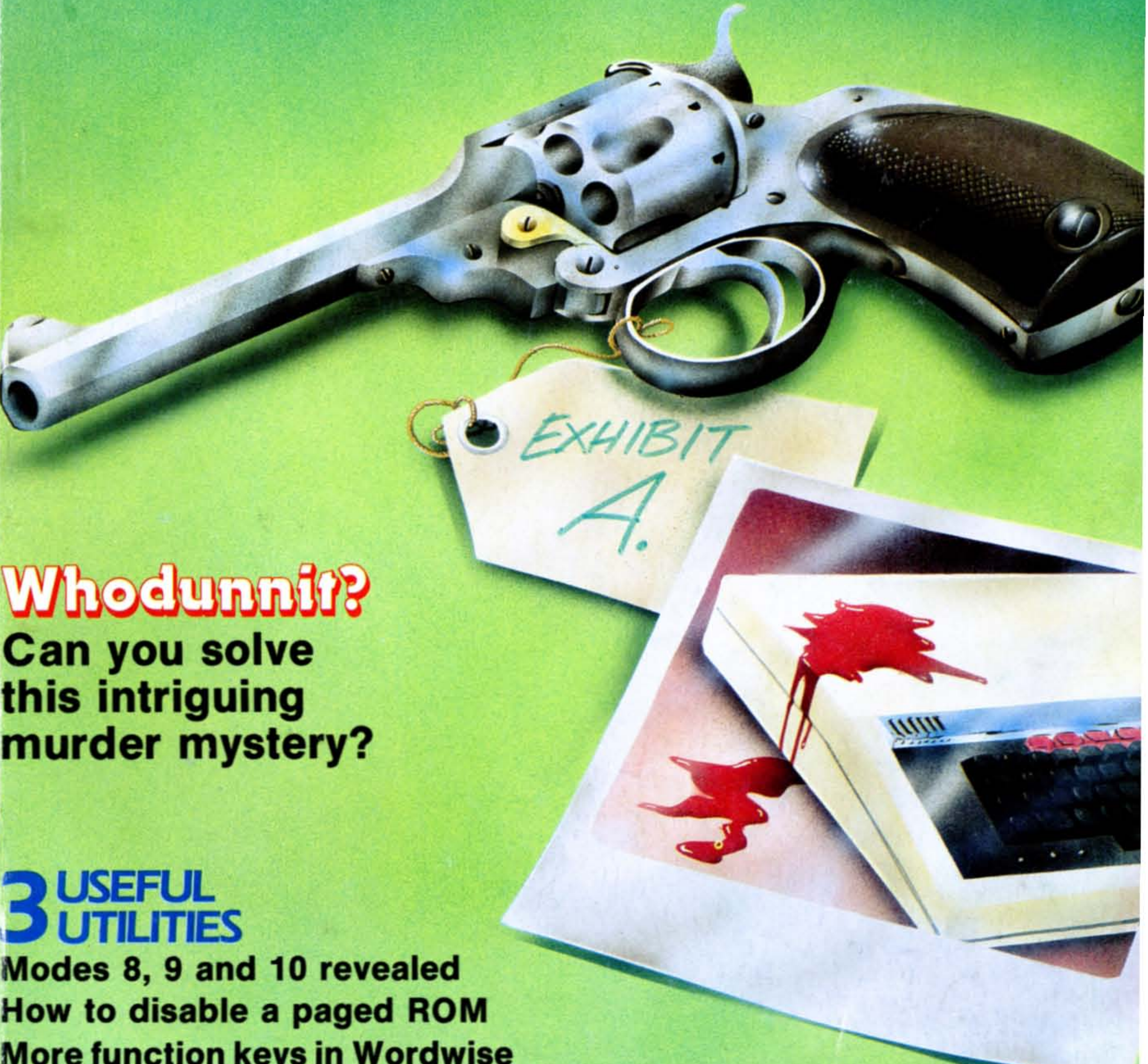
# THE MICRO USER

Volume 3
Number 9
November 1985
£1.25

*Top-selling guide to the BBC Micro!*

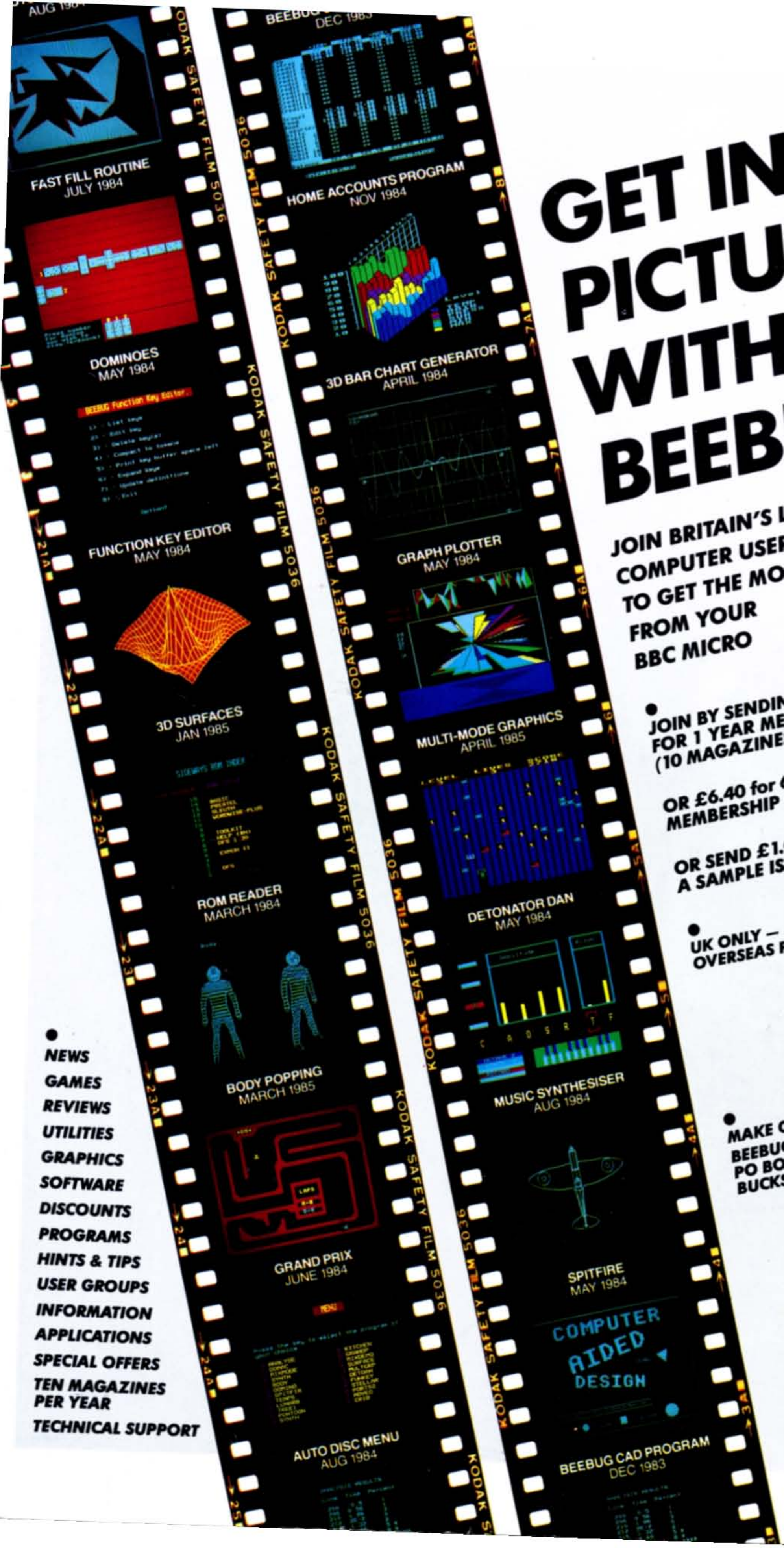


## Whodunnit?

**Can you solve this intriguing murder mystery?**

## 3 USEFUL UTILITIES

**Modes 8, 9 and 10 revealed**
**How to disable a paged ROM**
**More function keys in Wordwise**


AUG 198
FAST FILL ROUTINE
JULY 1984
DOMINOES
MAY 1984
FUNCTION KEY EDITOR
MAY 1984
3D SURFACES
JAN 1985
ROM READER
MARCH 1984
BODY POPPING
MARCH 1985
GRAND PRIX
JUNE 1984
AUTO DISC MENU
AUG 1984
BEEBU
DEC 198
HOME ACCOUNTS PROGRAM
NOV 1984
3D BAR CHART GENERATOR
APRIL 1984
GRAPH PLOTTER
MAY 1984
MULTI-MODE GRAPHICS
APRIL 1985
DETONATOR DAN
MAY 1984
MUSIC SYNTHESISER
AUG 1984
SPITFIRE
MAY 1984
COMPUTER AIDED DESIGN
BEEBUG CAD PROGRAM
DEC 1983
KODAK SAFETY FILM 5036

# GET IN THE PICTURE WITH BEEBUG

**JOIN BRITAIN'S LARGEST COMPUTER USER GROUP TO GET THE MOST FROM YOUR BBC MICRO**

- **JOIN BY SENDING £11.90 FOR 1 YEAR MEMBERSHIP (10 MAGAZINES)**

  **OR £6.40 for 6 MONTHS MEMBERSHIP (5 MAGAZINES).**

  **OR SEND £1.00 FOR A SAMPLE ISSUE (UK ONLY)**

- **UK ONLY — OVERSEAS PRICES ON APPLICATION**

- **MAKE CHEQUES PAYABLE TO**
  **BEEBUG**
  **PO BOX 109 HIGH WYCOMBE**
  **BUCKS.**

- ***NEWS***
  ***GAMES***
  ***REVIEWS***
  ***UTILITIES***
  ***GRAPHICS***
  ***SOFTWARE***
  ***DISCOUNTS***
  ***PROGRAMS***
  ***HINTS & TIPS***
  ***USER GROUPS***
  ***INFORMATION***
  ***APPLICATIONS***
  ***SPECIAL OFFERS***
  ***TEN MAGAZINES PER YEAR***
  ***TECHNICAL SUPPORT***

See us at Compec
Stand Nos. 9024 and 8185
DDL
DATA DISTRIBUTORS LIMITED
SEIKOSHA
SP-1000AP

# The Seikosha SP Series,

## advanced business printers for the growing business

All the advanced technology and craftsmanship of the 'House of Seiko' have now been applied to the needs of the small volume business user.

The result is the Seikosha SP Series.

A unique combination of high performance and low cost that puts the very best of business printers within easy reach of the smallest business.

Top of the range is the SP 1000.

Fast, quiet and reliable, it offers an impressive list of advanced features.

High speed quality Standard Pica Printing at 100cps (25cps NLQ), low noise levels, a variety of character fonts, 7 kinds of graphic printing and automatic paper loading are all just part of what you can expect from this superb printer.

Next in the range is the brilliant little Seikosha SP 800.

It combines most of the features of the SP 1000 with a print speed of 80cps (draft) and 20cps (NLQ). And, like the SP 1000, is the perfect companion to your micro.

At a cost of just £259.00 plus VAT for the SP 1000 and £249.00 plus VAT for the SP 800, these printers represent the best value for money on the market today.

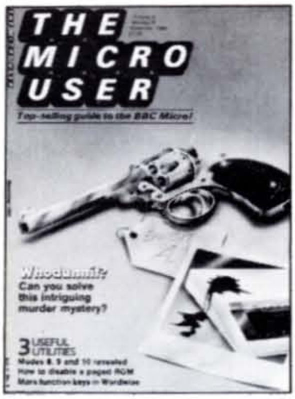
The ideal printers for the growing business in fact.

Distributed exclusively by DDL, the Seikosha SP range is available from all leading computer dealers. For details of your nearest stockist contact:

DDL

*5 King's Ride Park,*
*Ascot, Berks. SL5 8BP*
*Tel: 0990 28921*
*Telex: 846303 DD LTD G.*

***THE FORCE IN DISTRIBUTION***



Vol. 3 No. 9 November 1985

*Managing Editor*
**Derek Meakin**
*Features Editor*
**Mike Bibby**
*Production Editor*
**Peter Glover**
*Layout Design*
**Heather Sheldrick**
*Associate Editor*
**Alan McLachlan**
*News Editor*
**Mike Cowley**
*Technical Editor*
**Mike Cook**
*Advertisement Manager*
**John Riding**
*Advertising Sales*
**Mike Hayes**
**Margaret Clarke**
*Editor in Chief,*
*Database Publications*
**Peter Brameld**

Tel: 061-456 8835 (Editorial)
061-456 8383 (Administration)
061-456 8500 (Advertising)
061-480 0171 (Subscriptions)

Telecom Gold: 72:MAG001.
Telex: 265871 MONREF G.
Quoting Ref. MAG001.
Prestel Mailbox: 614568383.

**Published by:**
**Database Publications Ltd,**
**Europa House, 68 Chester Road,**
**Hazel Grove, Stockport SK7 5NY.**

**Subscription rates for**
**12 issues, post free:**

£15 – UK & Eire (Sterling only)
£25 – Rest of world (surface
£65 – Rest of world (airmail)

ABC **64,956**
January-June 1985

The Micro User welcomes program listings and articles for publication. Material should be typed or computer-printed, and preferably double-spaced. Program listings should be accompanied by cassette tape or disc. Please enclose a stamped, self-addressed envelope, otherwise the return of material cannot be guaranteed. Contributions accepted for publication will be on an all-rights basis.

© 1985 Database Publications Ltd. No material may be reproduced in whole or in part without written permission. While every care is taken, the publishers cannot be held legally responsible for any errors in articles, listings or advertisements.

*The Micro User is an independent publication and neither the BBC nor Acorn Computers Ltd are responsible for any of the articles in this issue or for any of the opinions expressed.*

News trade distribution:
Europress Sales and Distribution Limited, 11 Brighton Road, Crawley, West Sussex RH10 6AF. Circulation 0293 27053.

**NEWS** 23
Read all about it. All the latest events in the ever changing world of your BBC Micro.

**ROM ROUNDUP** 48
Lincoln Microsystem's Fileaid, and Floppy Wise from Software Services come under scrutiny.

**HARDWARE** 51
The truth and nothing but the truth? Find out for sure with this lie detector from Biogram.

**BASIC UTILITIES** 56
We finish off our series with an in-depth analysis of Acornsoft's new Basic Editor.

**WHODUNNIT?** 68
"Ello, ello, ello. Who's done the dirty deed then?" Are you able to unravel this murder mystery?

**ADVENTURES** 73
Once again our frank columnist takes her critical look at the world of adventures.

**SOFTWARE SCENE** 79
Our fearless reviewers present their detailed evaluation of some of the recent releases.

**WORDWISE F/KEYS** 84
Get more from your word processor with this utility to add extra commands to the f/keys.

**BASIC ANALYSER** 90
This series continues with a superb utility to take the drudgery out of debugging programs.

**PROBLEM PAGE** 99
Our electronics guru turns his thoughts to a DDFS, speech upgrades, and interfacing robots.

**101 BOOK REVIEW**
Short on sound ideas? Acornsoft's Creative Sound may guide you along the right lines.

**106 THE LIGHT PROGRAM**
Smiley was a bit of fun, now the subs are on the run. Al's trying another mega production.

**115 MICROLINK**
The monthly update on the ever increasing potential of the on-line database for micros.

**121 SIDEWAYS**
Add an extra dimension to your own programs with a simple sideways screen clear routine.

**131 SPREADSHEETS**
We evaluate Computer Concept's Inter-sheet and compare it with Ultracalc 2 and Viewsheet.

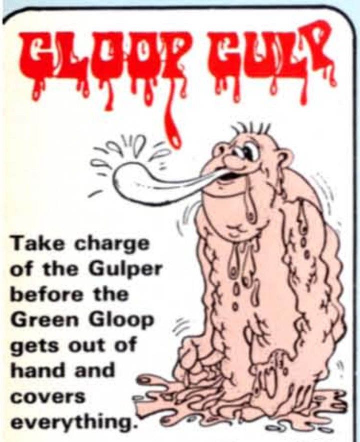
**136 VIEWSTORE**
Is Acornsoft's new addition to the View family the database you've always been looking for?

**143 BODY BUILDING**
These techniques for controlling small DC motors will be useful in many applications.

**149 DISABLER**
Prevent star command clashes between your ROMs with a utility to disable any at will.

**175 MICROMAIL**
The part of the magazine you write yourself – your news, views, ideas and moans.

**191 ORDER FORM**
From back issues to binders, cassettes to cases, discs to dust covers – they're all here.



**Take charge of the Gulper before the Green Gloop gets out of hand and covers everything.**

*– Page 110*

**8, 9, 10!**

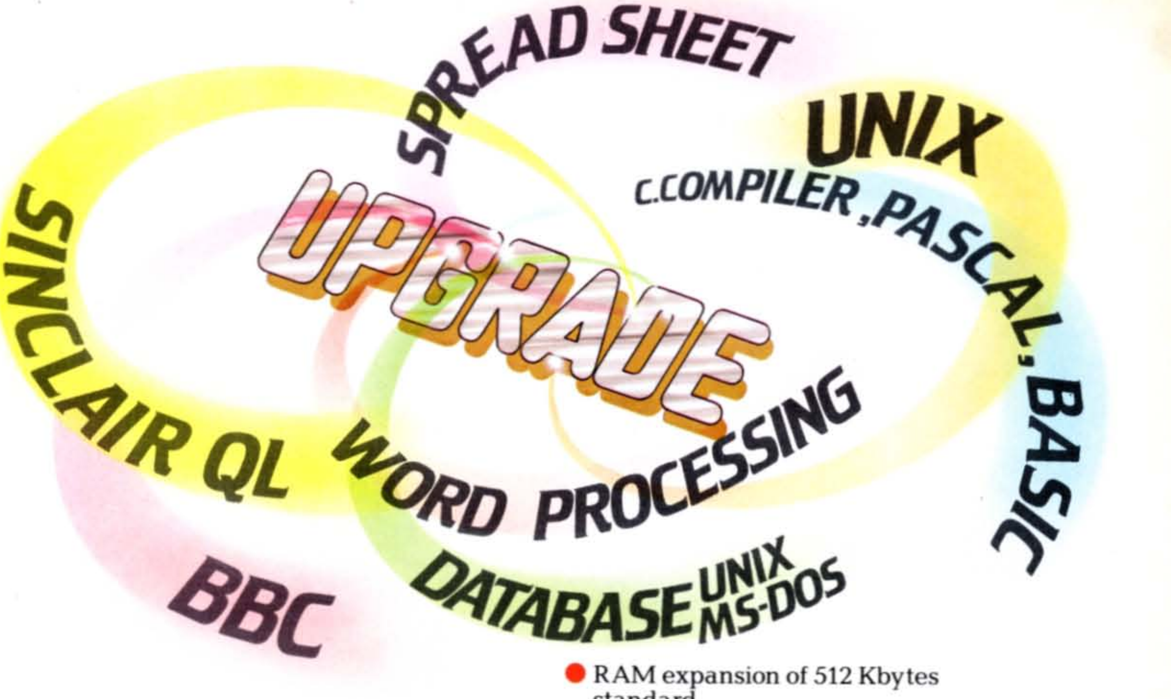
**We discover three extra modes for your BBC Micro**

*– Page 123*

ELECTRON & BBC MICRO USER SHOW

**All about our next BBC Micro Show held in Westminster from November 14 to 17.**

*– Page 126*



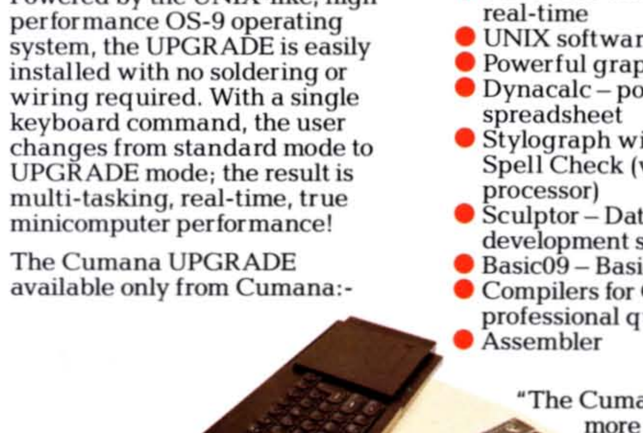
For all BBC B and QL micro users, the Cumana UPGRADE offers the chance to step into a truly professional environment.

Powered by the UNIX-like, high performance OS-9 operating system, the UPGRADE is easily installed with no soldering or wiring required. With a single keyboard command, the user changes from standard mode to UPGRADE mode; the result is multi-tasking, real-time, true minicomputer performance!

The Cumana UPGRADE available only from Cumana:-

- RAM expansion of 512 Kbytes standard
- Double density floppy disk controller
- Winchester disk interface for high storage capability
- Full multi-tasking in true real-time
- UNIX software compatibility
- Powerful graphics kernel
- Dynacalc – powerful electronic spreadsheet
- Stylograph with Mailmerge & Spell Check (versatile word processor)
- Sculptor – Database/Software development system
- Basic09 – Basic compiler
- Compilers for C and Pascal – professional quality compilers
- Assembler

"The Cumana UPGRADE – more performance, more payoff in your existing investment."



OS-9 and Basic 09
are trademarks of Microware & Motorola.
UNIX is a trademark of Bell Laboratories.
Sculptor is a trademark of MPD.
BBC is a trademark of Acorn.
Sinclair QL is a trademark of Sinclair Research Ltd.
MS-DOS is a trademark of Microsoft.

CUMANA®
The best name in memory

Cumana Ltd., Pines Trading Estate, Broad Street,
Guildford, Surrey, England, GU3 3BH.
Tel: Guildford (0483) 571666. Telex: 859380.

CUMANA UPGRADE

# Basic 3 For BBC Computer With Sideways RAM

Until now, only the lucky 32016 co-processor owners could afford to have 10,000 strings or variables at once in their programs. But now with the Solidisk Basic 3, you too, can play with similar facilities.

The Acorn's BAS128, as implemented at present on the 128K BBC PLUS, occupies the main user memory and uses 4 Sideways RAM banks to store both the program and the variables.

The Solidisk BASIC3 is an overlay for the BBC BASIC2, occupies 1 Sideways RAM bank, uses other Sideways RAM banks to store variables and leaves the program in the usual main memory.

The Solidisk version has some significant advantages, mainly:

1) The Solidisk BASIC 3 offers more space:

| | BBC B | +SWR32 : | +SWR64 | +SWR128 | +SWR256 |
|---|---|---|---|---|---|
| **Size for BASIC:** | 25.5K | 37.5K : | 69.5K | 133.5K | 261.5K |
| **128K BBC PLUS** | | | | | |

2) The Solidisk BASIC 3 is faster than BAS128, for example in running PCW Basic Benchmark (PCW January 85):

| COMPUTER | TIME IN SECONDS | RANK |
|---|---|---|
| BBC B + 6502 SECOND PROCESSOR: | 9.58 | 1 |
| BBC B + BASIC 2 | 14.27 | 2 |
| BBC B + BASIC 3 | 18.99 | 3 |
| ELECTRON | 20.44 | 4 |
| BBC 128K PLUS + BAS128 | 29.43 | 5 |

3) The Solidisk version loads, saves and runs programs in the usual main memory thus requiring no change to the programs.

4) The Solidisk version is available on disk and in ROM (as part of STL TOOLKIT ROM), BAS128 is available only on disc.

Solidisk Sideways RAM is compatible with all issues of BBC computers along with most current add-ons. To date, more than 45,000 Sideways RAMs have been sold.

Sideways RAM is similar to Sideways ROMs such as the BASIC ROM or the DFS ROM but it can be written into. This means that Sideways RAM can run all types of software that are normally available in ROMs.

Solidisk also has a large library of nearly 100 programs to maximise the use of Sideways RAM.

These include important software such as word-processor, database, spreadsheet, spelling, checker, macro Basic, Extended Basic, Virtual Memory, Index, Sprites, RAM Disc, Machine Code monitor, Digitised pictures, SFX etc... and entertaining computer games (Blitz, Meanies, Escape, Seawolf etc).

## THE NEW STYLE SWR64 AND 128K:

Solidisk have introduced a new style for the SWR64 and the SWR128.

The new RAM card has the capacity of 64k or 128k, upgradable to 256k and TWO intelligent ROM sockets accepting up to 64k of ROMs.

Each 32k EPROM (or 27256 EPROM) is treated as TWO separate 16k EPROMs and occupies 2 adjacent Sideways ROM banks.

You can use for example STL TOOLKIT + STL WORD PROCESSOR in one, DFS 2.1 and ADFS 2.1 in the other.

If you want to blow 32k EPROMs yourself, you will need the UVIPROM32, a new version of the UVIPROM Eprom Programmer capable of programming the AMD 27256 EPROMs (Programmer: £20.00, Eproms £10.00 each).

## PRICES

The listed price comprises the Sideways RAM fully guaranteed for 1 year, comprehensive manual and software pack 1 consisting of 5 diskettes formatted either in 40 or 80 track.

— SWR32 + 5 discs (32k unit, by far the most popular): £53.00
— SWR64 + 5 discs (64k unit, new introduction model): £80.00
— SWR128 + 5 discs (128k unit, the second most popular): £125.00
— Any Extra Software Pack (5 discs): £10.00 Specify 40 or 80 tracks.

As Solidisk Software Support Service has to produce in excess of £25,000 diskettes every month, we regret that we can no longer provide personalised service for disk washing. In extreme cases, when you need to update your software diskette, either reorder a new software package (which is always sold to you at nominal media cost i.e. £10.00 for 5 disks, including new manual, or return the old package with £2.00 to cover post and packing. You may avoid post and packing costs if you call at Solidisk's stand at any BBC micro exhibition or at the Solidisk office.

## UPGRADING

Upgrading from a smaller model is very simple: you return the old RAM board to us with your payment for the difference.

The listed prices include new manuals when necessary.

## SOFTWARE PACK 1

**(included with SWR)**

The Software package comprises 5 diskettes, formatted either in 40 or 80 track. Please specify when ordering.

Volume 1:
Volume 1 contains all the general applications of Sideways RAM. Menu, Printer Buffer, STL DFS 2.0, STL E00, RAMDISK, RFS (Rom generator), Fast Backup, Quickcopy, Index etc...

Volume 2:
Volume 2 contains the Solidisk Wordprocessor, Spelling Checker and the English Dictionary.

Volume 3:
Volume 3 contains the Solidisk Macro Basic (a program generator), a Linker-Editor, VMP the Virtual Memory Program, Sigen, a program to create your own dictionary and a sample French dictionary.

Volume 4:
Volume 4 contains the Solidisk Database.

Volume 5:
Volume 5 contains the Solidisk Sprites System.

## SOFTWARE PACK 2

**(optional)**

Volume 6:
Volume 6 contains the Solidisk Spreadsheet.
Menu driven with standard options to create, edit, recalculate, print, search, sort, report generator and mailmerge.
Unlimited number of rows and columns. Each column can be as small as 2 or as big as 70 characters. All math functions are supported. Complete with home banking and simple portfolio management.

Volume 7:
Volume 7 contains Solidisk Play Tunes System and lots of tunes and write music using ordinary ABCD notation.

Volume 8:
STL Toolkit has 24 star commands (Status, Rwipe, Check, Find, Search and Replace, Mode 8, Join, Keyload, LVAR, Salvage, Expand, Edit etc...).
STL SFX is Solidisk screen effects utility. In mode 2, you can scale, move, reverse, mirror etc with superlative ease.
VDURECORDER is another screen aid utility. It remembers everything sent to the screen. When you want it, *REPLAY will show it all over again but with an incredible speed.
Solimon is a machine code monitor for both 6502 and 65C02.

Volume 9:
Volume 9 contains the STL ADFS and disc utilities (see next page).

Volume 10:
Volume 10 contains the Solidisk Teletext Editor.

**Megagame Packs:**
Around 70 games are currently under compilation.

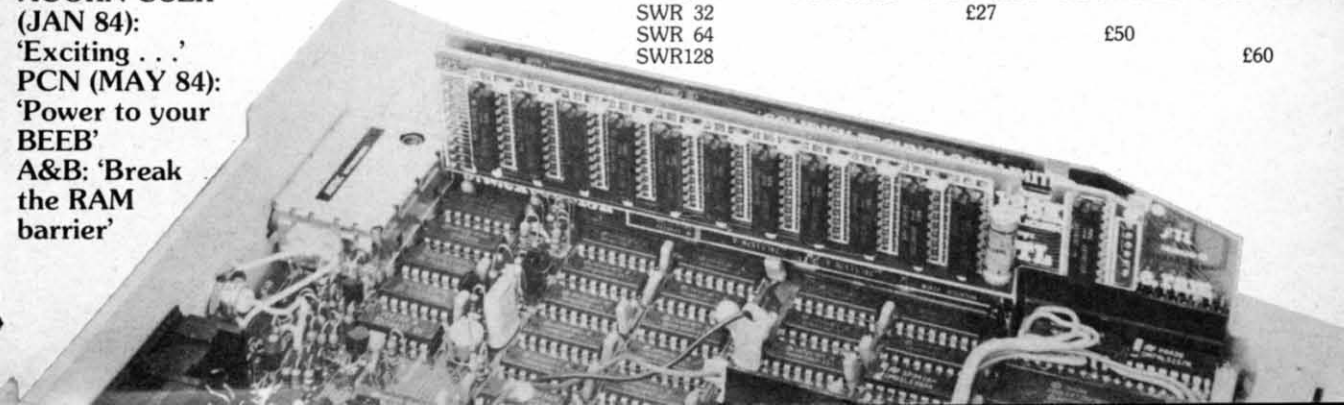
**SOLIDISK TECHNOLOGY LIMITED, 17 SWEYNE AVE, SOUTHEND-ON-SEA, ESSEX SS2 6JQ. TEL. SOUTHEND (0702) 354674 (16 lines).**

## WHAT THE SPECIALISTS SAY:

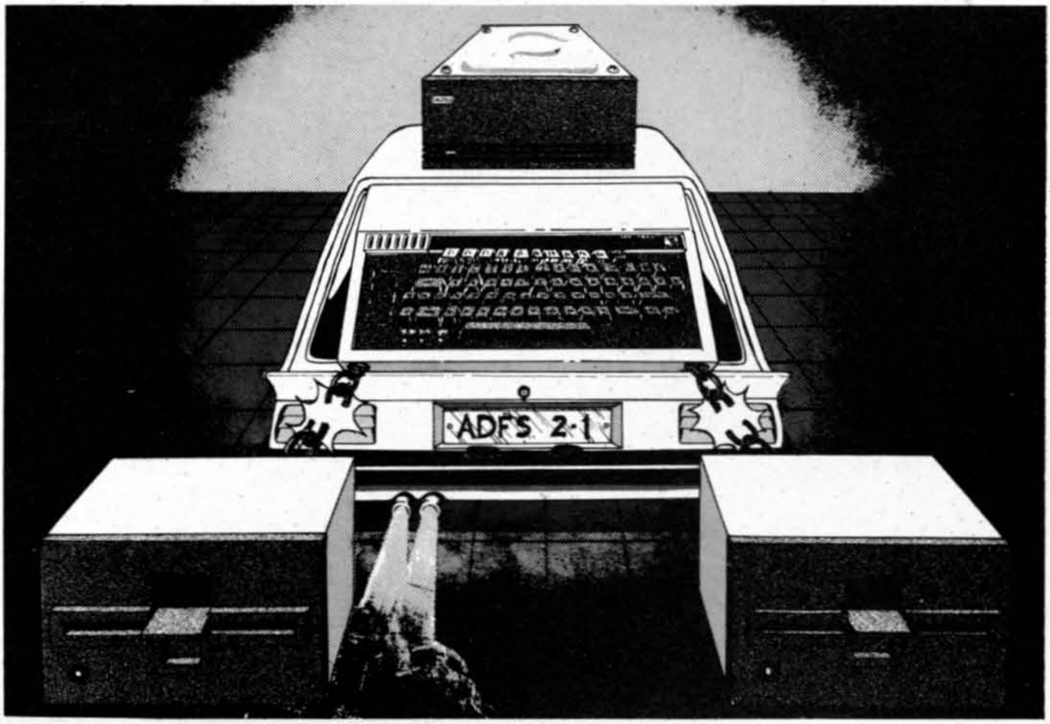
**ACORN USER (JAN 84): 'Exciting...'**
**PCN (MAY 84): 'Power to your BEEB'**
**A&B: 'Break the RAM barrier'**

**Effective from 15th of JULY 85:**

| FROM: | TO SWR32 | TO SWR64 | TO SWR128 | TO SWR256 |
|---|---|---|---|---|
| SWR 32 | | £27 | | |
| SWR 64 | | | £50 | |
| SWR128 | | | | £60 |



# LOAD AND RUN IN 100 MILLISECONDS (Or Less)...



Would you believe that your BBC Micro will LOAD and RUN a small BASIC program from your Winchester in less than a TENTH OF A SECOND?

Yes, it's perfectly true when you have a Winchester hard disc for it.

How well does your BBC computer compare against the best sellers in 'business micros' such as the IBM PC, the APRICOT, the COMPAQ or the SIRIUS?

Eric Bagshaw, of the prestigious National Computing Centre has devised a series of tests to reflect as closely as possible the performance of various business computers in actual use.

He put computers like the APRICOT, COMPAQ, FORTUNE, IBM, RAIR, SIRIUS, XEROX etc... through the same tests and published the results in the November 84 issue of PCW and the July 85 issue of Practical Computing but he missed out an important one: the BBC computer.

We had to wait until Gordon Taylor, journalist and reviewer for A&B Computing adapted the Bagshaw Disc Benchmarks to run on the BBC. We were quite astonished by the findings. Just look at the figures below:

| BENCHMARKS | WITH FLOPPY* | WITH 20 MB HARD DISC** |
|---|---|---|
| BM0 *LOAD SIXTEEN | 1.94 | 0.87 |
| BM1 WRITE SEQUENTIAL FILE | 9.57 | 2.86 |
| BM2 READ SEQUENTIAL FILE | 4.30 | 1.84 |
| BM3 WRITE RANDOM FILE | 22.62 | 10.37 |
| BM4 READ RANDOM FILE | 10.20 | 8.54 |
| BM5 MULTI OPEN AND WRITE SEQ. | 68.77 | 19.29 |
| BM6 MULTI OPEN AND READ SEQ. | 4.29 | 1.54 |
| BM7 MULTI OPEN AND WRITE RANDOM | 70.63 | 19.74 |
| BM8 MULTI OPEN AND READ RANDOM | 4.33 | 1.53 |
| BM9 RANDOM READ IN RANDOM FILE | 8.48 | 1.98 |
| BM10 RANDOM WRITE IN RANDOM FILE | 24.62 | 2.65 |
| BM11 FRONT/END SWAP IN RANDOM FILE | 368.06 | 65.18 |
| BM12 CLOSE UP HOLES IN RANDOM FILE | 33.66 | 18.26 |
| BM13 CLOSE ALL DATA FILES | 34.64 | 9.05 |
| TIME IN SECONDS.................................... | 663.97 | 163.70 |

* BBC computer fitted with 1.3 MB Solidisk 5.25" half height floppy disc drives, running Solidisk ADFS 2.1 (double density).

** BBC computer fitted with Solidisk XD20/40 Winchester (20MB), running Solidisk ADFS 2.1.

Now compare these figures with those published for leading business computers*:

| COMPUTER | | TIME | RANK |
|---|---|---|---|
| BBC with | 20 MB** | 164 | 1 |
| FTS | 20 MB | 187 | 2 |
| APRICOT XI | 10 MB | 192 | 3 |
| SIRIUS | 10 MB | 203 | 4 |
| IBM XT | 10 MB | 254 | 5 |

* Source: PCW September 1984.

** BBC computer fitted with Solidisk 20 MB, figure not published in PCW.

The BBC computer with Solidisk equipment is faster than the Fortune, the Apricot, the Sirius and up to 50% faster than the IBM PC-XT!!

At least until the new micros such as the ST520 or the AMIGA gain wide public acceptance (which may never happen), you can be quite sure that your BBC computer will remain the BEST computer around.

This is especially true for those who use the 6502, the Z80★ and the 32016 Second Processors and ECONET.

Few have been able to discover the real strength of their BBC system, mostly because of the high price of Acorn Winchesters.

Now with Solidisk, price is no longer a barrier.

You can buy a 10 MB 'Minimum Configuration' at only £399.00 + VAT★★. So, rather than waiting for Acorn to reduce their price, ring us today; we will despatch it to you by DATAPOST within 48 hours (credit card orders only).

* Z80 owners: CP/M BIOS 1.20 will run immediately on the Winchester because Solidisk DFS 2.1 has partitioning capability. This means that you can create 'drives' 4, 5, 6 etc... on the Winchester, and backing up your DFS floppy discs onto the Winchester.

Normally, a new MFM BIOS and new BOOT ROM are required.

(**) Minimum Configuration:

1) 10 MB drive, net formatted capacity.
2) Western Digital Hard Disc Controller.
3) Solidisk SASI interface.
4) Solidisk ADFS 2.1.

The minimum configuration is designed to work with all BBC Computers fitted with the later Switched Mode PSU (shiny) as on late issue 3, issue 4 and 7 machines alongside a single low power half height floppy disc drive such as the Mitsubishi in the SOlidisk Disc Offer, with or without a second processor and with or without the new style low power SWR64/128 board.

If you have any other add-on draining power directly from the computer's PSU, you must order the XD-10 or disconnect the floppy disc drive.

PLEASE NOTE: if you intend to use floppy disks with the ADFS, you must also purchase the Solidisk 1770 DFS interface or the 1770 + 8271 DFDC interface.

All Winchester drive offers contain some useful software such as database, wordprocessor and utilities. See full review in A&B Computing, September 85.

Solidisk also has one of the most efficient software support systems in the country; our engineers are experienced, enthusiast and helpful. Should you need assistance or advice, please do not hesitate to contact us and talk about it, we may be able to help since we may know of people using our Winchesters for programming, off loading mainframes, running Viewstore, running mail orders, medical practices etc...

**SOLIDISK TECHNOLOGY LIMITED, 17 SWEYNE AVE, SOUTHEND-ON-SEA, ESSEX SS2 6JQ. TEL. SOUTHEND (0702) 354674 (16 lines).**

# ADVANCED FILING

## SOLIDISK
## 1770
## DISC INTERFACE
### For the BBC Computer

The Solidisk Double Density 1770 Disc Interface enables the standard BBC B computer to use most current types of disk drive. Only 4 components need to be fitted into existing sockets on the computer and this can be done in a few minutes by novice and expert alike. It now can run all Acornsoft games (such as Elite, Aviator, Revs, Magic Mushroom etc. . . .) and most other protected discs (Castles Quest, Island's Music System etc. . . .)

The Disk filing System provides every facility that you would expect such as built-in disc formatter and verifier, automatic 40/80 track switching, programmable disc speed and is upgradable to the Solidisk ADFS.

It also has some significant advantages over the Acorn 1770 system, mainly:

1) 60% more storage capacity in double density DFS, giving you up to 640k on a double sided 80 track diskette as opposed to only 400k bytes with the Acorn 1770.

2) Better emulation of the 8271: some protected discs (such as the early Acornsoft's Elite game) would not run on the Acorn 1770.

3) Built-in useful disk utilities such as TAPEDISC, MZAP, DZAP (disc sector editor), RECOVER, RESTORE etc. . . . which would add to cost if bought separately.

### PRICE:

The 1770 Double Density Disc Interface costs £45.00 inclusive of VAT, DFS 2.0 ROM, manual and 1 year guarantee.
If you wish, you can also order it with the ADFS ROM and the total cost is £55.00 inclusive.

STL

SOLIDISK TECHNOLOGY LIMITED

COMPUTERS PERIPHERALS MICROPROCESSOR DEDICATED SYSTEMS
Tel: (0702) 354674 Trade Name: AUDIO COMPUTERS
17 Sweyne Avenue, Southend-on-Sea, Essex SS2 6JQ

SOLIDISK DISK FILING SYSTEM

15,000 SOLD

## SOLIDISK
## ADVANCED DISC FILING SYSTEM
### for the BBC Computer

The Advanced Disc filing System (ADFS) is now officially endorsed by Acorn and is certainly going to revolutionise software for the BBC Micro.
The Solidisk ADFS, reviewed in A&B Computing 85, whilst comparable to Acorn's ADFS, is very much designed with floppy disk and DFS software compatibility in mind.
The Solidisk ADFS will run most software available for the BBC computer, including all Acorn languages and the View family, Computer Concepts Wordwise and the INTER family, Gemini's Datagem etc. . . .
It also has PAGE at the lowest value, eg &1900 with one channel. It can realistically support up to 10 opened channels without slowing down the program as it does not swap buffer pages to disc. It also has utilities such as *FORM, *VERIFY, *BACKUP etc not found in the Acorn ADFS ROM.
It is also very responsive and double safe, with automatic head settling and read after write automatic error correction.
It runs with all Acorn second processors including the latest 32016 mainframe machine (only Z80 CP/M requires new MFM BIOS) and it is fully supported by the Solidisk Toolkit ROM.
The Solidisk ADFS is available for the BBC B or PLUS fitted with the Solidisk 1770 Disc Interface or the Acorn 1770 as a TWO ROM chip set, consisting of the DFS 2.1 and the ADFS 2.1. A 32k ROM may be supplied in lieu of the 2 ROMs on request. It costs £20.00 when purchased separately like this.

## SOLIDISK
## 1770 + 8271
## Disc Interface
### For the BBC Computer

As Acorn are now backing the Advanced Disc Filing System, many of you, having got the 8271 Disc Interface, wonder what you are going to do next.

If you get the Acorn 1770 upgrade, you will have to part with your 8271 and possibly a few expensive pieces of software such as the old Elite or Replica II which won't run without the 8271. It is still only a single density DFS.

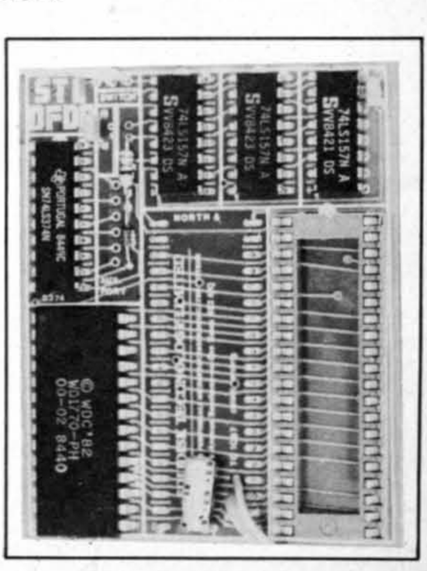
The alternative is to get the Solidisk 1770 + 8271 Disc Interface (known as the DFDC, acronym for Dual Floppy Disc Controller) which will let you keep the 8271 which you already have and add 1770 Double Density capability.

It is low cost, tiday and easy to fit.

At a flick of a switch, you can select either the 8271 or the 1770 Floppy Disc Controller.

You will have the best of both worlds: compatibility with the 8271 and fascination with the 1770 ADFS.

It is probably the fastest, more powerful and versatile Disc System for the BBC.
The DFDC costs £60.00 including VAT, manual, DFS 2.0 ROM and ADFS 2.1 ROM.



**SOLIDISK TECHNOLOGY LIMITED, 17 SWEYNE AVE, SOUTHEND-ON-SEA, ESSEX SS2 6JQ. TEL. SOUTHEND (0702) 354674 (16 lines).**

# SOLIDISK MITSUBISHI DISC OFFER

A Complete Disc System containing everything you need, including 1 Blank Diskette, at a new low price of only £200.00 inclusive.

The Misubishi Offer Comprises:

- One Mitsubishi MF4853, Double Sided, 80 Track Disc Drive. Cased in beige with all leads.
- One Solidisk DDFS complete Disc Upgrade with 2.0 ROM.
- One Verbatim MD525 Blank Diskette.
- One Software Pack and User Manuals.
- Full one year guarantee.

**FREE**: ADFS ROM!

## HARDWARE:

As described earlier as shown opposite.

## THE SOFTWARE:

The software comprises 5 diskettes, formatted in 80 tracks.

**Volume 1:**

Solidisk Word Processor and Spelling checker with English dictionary. Easier than View, Wordwise or Scribe, you enter the WP by *WP filename, then start typing. What you see on the screen will be exactly printed on paper.

Most useful commands are all displayed on the top part of the screen.

It features 80 column screen throughout with direct on screen justification, automatic margins, page numbering, Wordstar like editing commands for block move, block delete, block copy, print, save, load text to cursor, insert and overwrite, search and replace, total word count, word frequency count, free space, *commands etc. Solidisk WP loads and saves texts in under 1 second flat and also you may save the edited version as many times and under any filename you like.

It has the unusual ability to spellcheck your document without leaving it, simply by typing in Control-U.

It has self dictionary generating capability too. You may create any dictionary you like by just simply entering the words.

**Volume 2:**

Volume 2 contains Solidisk Database. It is a random access system, completely menu driven and easily customised to suit any particular filing need.

It features unlimited filesize and number of records, supports all maths functions and 80 column screen throughout.

It is simple to understand and to use. You take one of the 15 different options to start. Each option will then lead to a new menu and so on. Mostly you only have to enter an appropriate data or hit the RETURN key.

You can design new databases, list all records, edit them, merge them, split them, making mailshot with Solidisk WP etc. . . We use it to process all your orders.

**Volume 3:**

Volume 3 contains Solidisk Spreadsheet. Menu driven with standard options to create, edit, recalculate, print, search, sort, report generator and mailmerge.

Unlimited number of rows and columns. Each column can be as small as 2 or as big as 70 characters. All math functions are supported. Complete with home banking and simple portfolio management.

**Volume 4:**

Volume 4 contains the Solidisk tape to disc program and a selection of computer games.

**Volume 5:**

Volume 5 contains MBASIC, SIGEN and other disc utilities.

## IMPORTANT:

If you upgrade to a twin Mitsubishi disc system, Solidisk will offer you, subject to stock availability, a completely free set of CPU and keyboard case as shown earlier.

You should return your disc drive with payment for another Mitsubishi MF4853 (£160.00) or alternatively, save by ordering right now a Fantastic Offer at only £340.00.

The keyboard is 12 mm lower than the normal BBC case, 2-3 degrees more angled, weighs only 5lbs, does not skid about on the desk while enjoying 2 feet of freedom from the computer unit — and makes a lot of difference to typists (even 2 fingered ones!)

The CPU accommodates 2 disk drives and withstands any heavy weight monitor while providing easy attachment for the whole system, CPU and disk drives, to the desk if need be. Good ventilation to the power supply too and hides all untiday cables away.

## PRICE

The complete CPU and keyboard case costs £30.00 inclusive + £3.00 post and packing. The system could be yours free as part of the Mitsubishi twin discs offer.

**SOLIDISK TECHNOLOGY LIMITED, 17 SWEYNE AVE, SOUTHEND-ON-SEA, ESSEX SS2 6JQ. TEL. SOUTHEND (0702) 354674 (16 lines).**

# WIN THE MAZE GAME . . .

Investing in extra equipment for your BBC Micro really needs thinking about; bear in mind, for instance, that for the last five years, all efforts have been put into more memory and faster disks.

The problem is that you may end up with a hotch potch of add-ons from different suppliers, and some may be reluctant to give advice on the whole ensemble.

We should know — here at Solidisk, we see it every day.

So how can you, too, keep pace with the latest technology?

The easy answer is buy important pieces of hardware from Solidisk.

Solidisk design rules adhere strictly to 2 principles:

a) 'Minimum Disruption' to the standard machine.
b) 'Do it in software' if at all possible.

We have Double Density Disc Interface, Winchester, Advanced DFS, Sideways RAM, Shadow/MOS RAM and MODEM and more than 50,000 happy users.

They are happy because their computers have more facilities, run faster, look tidy and usually cost them less money.

For many, it's the support that they receive that they are most happy about.

With over 90 Local Experts covering England, Scotland and Wales, with presence in Holland, France and Australia, Solidisk can offer many users free fitting and advice.

We also make available an ever increasing catalogue of free software to all Solidisk users.

Solidisk Software Support Service can give you the sort of service only matched by the largest companies.

It's up to you to decide. Although they are happy now, many have made the journey twice and they are not ready to do it again.

# SOLIDISK LOCAL EXPERTS

Solidisk has a nationwide network of more than 90 local experts and a growing number of experts overseas.

They do not sell our equipment, but they can generally fit it for you absolutely free of charge. If you would like to take advantage of this unparalleled service, ring us once you have our equipment for the name and telephone number of your nearest one. All areas are currently covered, but we still intend to expand the network; if you are interested, please call us for details.

**PRICE LIST: (all prices include VAT unless otherwise indicated. We export world wide — contact us for details on prices and delivery).**

| | Prices | P&P |
|---|---|---|
| **BBC SIDEWAYS RAM:** | | |
| SWR32 | £53.00 | £2.00 |
| SWR64 | £80.00 | £2.00 |
| SWR128 | £125.00 | £2.00 |
| SWR256 | £175.00 | £2.00 |
| Software pack 2 | £10.00 | £2.00 |

NB: all versions of the Sideways Ram come supplied with Software Pack 1 free of charge. Please specify 40 or 80 tracks when ordering.
Pack 1 is available without the Sideways Ram at a cost of £10 + £2 P + P.

| | Prices | P&P |
|---|---|---|
| **1770 DISC INTERFACE:** | | |
| 1770 Double Density with DFS 2.0 ROM | £45.00 | £1.00 |
| 1770 Double Density with ADFS | £55.00 | £1.00 |
| 1770 + 8271 DFDC with ADFS | £60.00 | £1.00 |
| **DISC OFFERS:** | | |
| 640k with ADFS Disc Offer<br>(£10.00 Datapost) | £200.00 | £3.00 |
| 1.3MB with ADFS, CPU and keyboard case<br>(£10.00 Datapost) | £340.00 | £5.00 |
| **WINCHESTER DISC DRIVES:** | | |
| XD-10 without PSU 10MB (Minimum config) | £399.00 | + VAT |
| XD-10 10MB (with additional PSU) | £460.00 | + VAT |
| The following prices include keyboard and CPU case: | | |
| XD-20/40 20 MB | £699.00 | + VAT |
| XD-20/40 TWIN (40 MB) | £1100.00 | + VAT |
| XD-30/60 30 MB | £900.00 | + VAT |
| XD-30/60 TWIN (60MB) | £1300.00 | + VAT |

All Winchester systems are despatched by Datapost within the UK, included in the prices above. (Please remember that if you also need to use floppy disks in conjunction with these, it is advisable to also purchase our 1770 DFS interface or 1770 + 8271 DFDC interface — see previous pages.)

| | Prices | P&P |
|---|---|---|
| **EPROMS:** | | |
| 2764 × 5 | £24.00 | £1.00 |
| 27128 × 3 | £25.00 | £1.00 |
| 27256 (to be used on UVIPROM32) | £10.00 | £1.00 |
| UVIPROM Eprom programmer, suitable for 2764, 27128 | £19.00 | £2.00 |
| UVIPROM32 Eprom programmer, special for AMD27256 | £20.00 | £2.00 |
| UVIPAC Eprom Eraser | £21.00 | £2.00 |
| **DISKETTES:** | | |
| Datalife MD525 SS/DD | £17.00 | £1.00 |
| Datalife MD557 2S/4D | £28.00 | £1.00 |
| **MISC.** | | |
| CPU and KEYBOARD case | £30.00 | £4.00 |
| Solidisk TOOLKIT a must for ADFS | £10.00 | £1.00 |
| DFS + ADFS if purchased separately | £20.00 | £1.00 |
| EFS for the Electron | £59.00 | £1.00 |
| Special 3.5" Electron disc offer | £197.00 | £3.00 |

Please circle: BBC Model B/B PLUS/40 tracks/80 tracks.

Name: ____________________

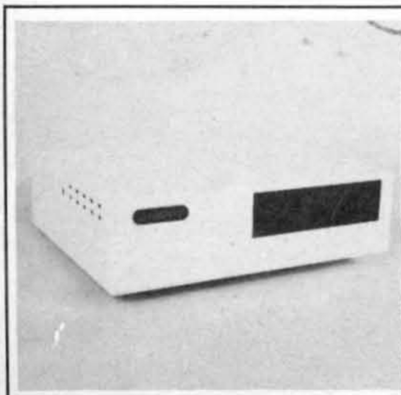
Address: ____________________

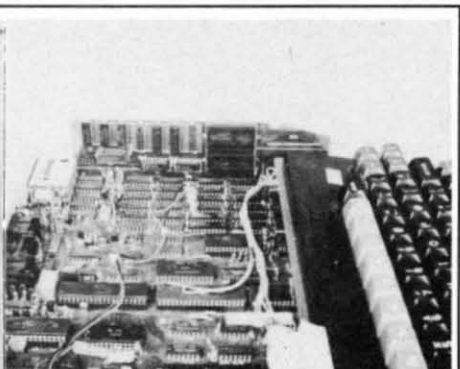
____________________

BARCLAY/ACCESS : : : : : : : : : : : : : : : : : : :

We reserve the right to change prices and specifications without notice and delivery is subject to availability. Please call our office for confirmation. Callers are welcome Monday to Friday 9.30 to 5.30. Please note that we are closed on Saturdays. Callers requiring fittings or installation checks: it is now essential to ring for an appointment.

SOLIDISK TECHNOLOGY LTD 17 SWEYNE AVENUE SOUTHEND ESSEX SS2 6JQ
TEL: (0702) 354674 (16 LINES)





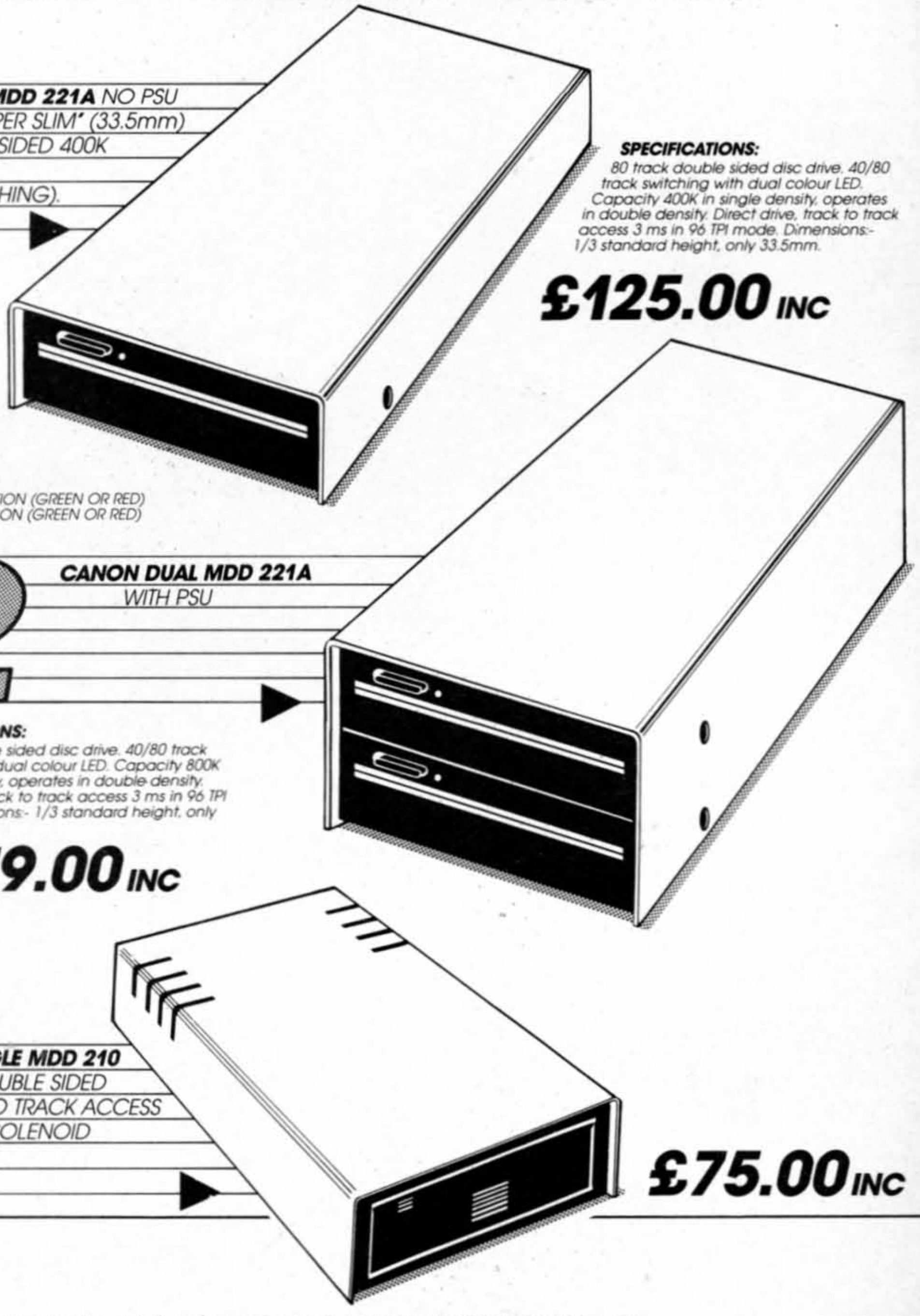
# SOLIDISK TECHNOLOGY

## Tel. SOUTHEND (0702) 354674

## (16 lines)

SOLIDISK TECHNOLOGY LIMITED, 17 SWEYNE AVE, SOUTHEND-ON-SEA, ESSEX SS2 6JQ. TEL. SOUTHEND (0702) 354674 (16 lines).

# Today's Technology at Yesterday's Prices from Chase Data.



1

**CANON SINGLE MDD 221A** NO PSU
CANON 221A "SUPER SLIM" (33.5mm)
80 TRACK DOUBLE SIDED 400K
FLOPPY DISC DRIVE
(40/80 TRACK SWITCHING).

**SPECIFICATIONS:**
*80 track double sided disc drive. 40/80 track switching with dual colour LED. Capacity 400K in single density, operates in double density. Direct drive, track to track access 3 ms in 96 TPI mode. Dimensions:- 1/3 standard height, only 33.5mm.*

**£125.00 INC**

*All Canon 40/80 switchable disc drives feature an on-board dual-colour LED on the front panel to show track mode selected. This is coupled with our own unique two-stage illumination. To give a clear operating status, as follows.*

| | |
|---|---|
| 40 TRACK MODE: | LED GREEN |
| 80 TRACK MODE: | LED RED |
| POWER ON: | HALF-ILLUMINATION (GREEN OR RED) |
| DRIVE SELECTED: | FULL-ILLUMINATION (GREEN OR RED) |

2

**CANON DUAL MDD 221A**
WITH PSU

**SPECIFICATIONS:**
*80 track double sided disc drive. 40/80 track switching with dual colour LED. Capacity 800K in single density, operates in double density. Direct drive, track to track access 3 ms in 96 TPI mode. Dimensions:- 1/3 standard height, only 33.5mm.*

**£279.00 INC**

3

**CANON SINGLE MDD 210**
40 TRACK DOUBLE SIDED
6ms TRACK TO TRACK ACCESS
HEAD LOAD SOLENOID
DIRECT DRIVE

**£75.00 INC**

**CHASE DATA LTD THE DISC DRIVE COMPANY WITH DIRECT PURCHASE FROM JAPAN AND A PROFESSIONAL AFTER SALES SERVICE.**

## 4

## CHASE DATA SOFTWARE

NOW COMPATIBLE WITH
UDM & OPUS DFS
PLEASE STATE
WHEN ORDERING

Vector 1

**VECTOR 1 The ultimate tape to disc utility.** Vector 1allows you to transfer almost all your tape software to disc. Unlike others, you only need to buy 1 copy of Vector 1 since it transfers tapes to specially formatted program discs. This is easily the most powerful tape to disc utility available.

**Vector 2 New 1.2 VER. Disc to disc utility.** Vector 2 allows you to make backup copies of all your valuable disc software. It is the most advanced utility of its kind available. **It is a condition of sale that neither of these products are used for infringement of copyright.**

Vector 1 **£16** On its own
**£15** If purchased with disc drive
Vector 2 **£16** On its own
**£15** If purchased with disc drive
Vector 1 & 2 **£30**

## 5

## DISCUS

DISCUS

Test utility for testing your own disc drive, at regular intervals to avoid the dreaded flop of your floppy. Menu driven, easy to use, 40 or 80 track versions.

**TESTS:** Motor speed, read/write, steptest, alignment test,* step and read/write test, read only test.
**£8.00** inc. **£7.00** if purchased with disc drive.
*This test requires an oscilloscope and alignment disc.

## EPROMS

QUALITY EPROMS BY 'HITACHI'

| | |
|---|---|
| **2764-250 NS** | **£3.00** |
| **27128-250 NS** | **£5.00** |

**INCLUSIVE OF P&P & VAT**

## 6

## DIAGRAM

A PROGRAM WHICH ALLOWS YOU TO STORE VERY LARGE DIAGRAMS — UP TO 39 MODE 0 SCREENS — AND VIEW OR EDIT THEM BY SCROLLING THE COMPUTER SCREEN AROUND OVER ANY PART OF THE DIAGRAM

**FEATURES**

- Draw diagrams, schematics, plans etc., in any aspect ratio, e.g. 10*3, 2*12 screens.
- Access any part of the diagram rapidly by entering an index name, e.g. TR6, R5 etc., to display a specific section of the diagram, and then scroll around to any other part of the diagram using the cursor keys.
- Up to 128 Icons may be predefined for each diagram, e.g. Transistors, resistors etc., in full mode 0 definition, up to 32 pixels horizontally by 24 vertically.
- Hard copy printouts in varying print sizes up to 9 mode 0 screens on an A4 size sheet, compatible with most dot matrix printers.
- Many other features including, selectable display colours, comprehensive line drawing facilities, TAB settings, etc.
- Disc contains sample diagrams and two versions of the program, one of which will work from a 16K sideways RAM.
- Comprehensive instruction manual.

**£28.75** **Including P&P & VAT** Supplied only on disc 40T/80T compatible.

**DON'T FORGET YOUR VECTOR 1 & 2 WHEN ORDERING.**

**All inclusive price list:** This means: disc drive + case + all power & data cables + UK carriage + utilities disc & manual + VAT.

| **Model** | **CANON** | **210** | **220** | **221A** | **596D** |
|---|---|---|---|---|---|
| **Formatted Capacity per drive on BBC Micro:** | | **200K** | **400K** | **400K** | **SANYO 400K** |
| **Single Drive & Case:** | | **£75** | **£119** | **£125** | **£149** |
| **Single Drive & Case/PSU:** *u/c – UPGRADEABLE | | — | **£144** | **£173*u/c** | **£174** |
| **Dual Drive & Case** | | — | **£229** | — | **£279** |
| **Dual Drive & Case/PSU:** | | **£185** | **£244** | **£279** | **£309** |

## FUJI FLOPPY DISCS

| | Per box 10 | If purchased with disc drive |
|---|---|---|
| 40 TK SS DD | **£17.60** | **£15.60** |
| 40 TK DS DD | **£24.50** | **£22.50** |
| 80 TK DS DD | **£28.60** | **£26.60** |

These prices include VAT & P&P.

**Support:**
Warranty: All disc drives sold by Chase Data Ltd come with a full one-year warranty on parts & labour with optional extended warranty on all drives.

**Extended Warranty**
**Your Insurance of trouble free operation.**
**When ordering your disc drive, ask about our second and third year extended warranty scheme. This covers ALL PARTS AND LABOUR and costs from as little as £15.00 on single drives and £23.00 on dual drives.**

**Payment:**
By Post:

Send your remittance (cheques only please) with your order to: Chase Data Limited, Unit 2, Crabtree Road, Thorpe Industrial Estate, Egham, Surrey TW20 8RN.
By Phone: **(Tel: 0784-38487).** Allow up to 21 days for delivery.

# CHASE DATA

**SEE US ON STAND 47 ON THE 27th - 29th SEPTEMBER AT THE BBC MICRO USER SHOW MANCHESTER.**

# COMPUTER WAREHOUSE

1000's OF
BARGAINS
FOR CALLERS

## THE "ALLADINS' CAVE OF COMPUTER AND ELECTRONIC EQUIPMENT

### EX-STOCK INTEGRATED CIRCUITS

**4164** 200ns D RAMS 8 for **£14.95** **4116** 300 ns **£1.50** **2112 £10.00 2114 £2.50 2102 £2.00 6116 £2.50** **EPROMS** 2716 £4.50 **2732** £3.00 **2764** £4.95 **27128** £5.50 **6800** £2.50 **6821** £1.00 **68A09** £8.00 **6B09** £10.00 **8085** £5.50 **8086** £15.00 **8251** £7.00 **8748** £15.00.

**Thousands of IC's EX STOCK send SAE for list.**

### RECHARGEABLE BATTERIES

Dry Fit **MAINTENANCE FREE** by Sonnenschein & Yuasa
**A300 07191315** 12v 3ah as RS 591-770 **NEW £13.95**
**A300 07191312** 6v 3ah as RS 591-360 **NEW £9.95**
**A300 07191202** 6-0-5v 1.8ah as RS 591-382 Ex Equip **£5.99** 3.6v 100 mah PCB mount as RS 591-477 **NEW** £1.00

### HOT LINE DATA BASE

## DISTEL©

The **ORIGINAL FREE OF CHARGE** dial up data base. Buy, browse or place **YOUR OWN AD** for goods or services to sell. 1000's of stock items, spares and one off bargains. Updated daily.
**ON LINE NOW.** CCITT, 8 bit word, no parity.
For **300** baud modems call 01-679 1888
For **1200**-75 baud modems call 01-679 6183

### PRINTER / TERMINAL SCOOP

A **MASSIVE** purchase of these attractive stand alone terminal units enables a **SUPER BARGAIN** offer. Made by the **US GENERAL ELECTRIC CORPORATION** the **GE MODEL 30** features a standard **QWERTY** 80 key electronic keyboard coupled to a quality built matrix printer with variable 3" to 9.5" forms tractor. The printer is capable of continuous duty printing, with up to 120 characters per line. Standard **RS232** interface accepts **ASCII** data at 110, 150 or 300 baud. Ideal for Terminals, Data loggers, local label printing, or just as a printer!! Sold **TESTED** with data **ONLY £95.00**. Also available with **TWIN MAGTAPE CASSETTE** unit for data capture, data preparation etc **£150.00** Carriage £10.00.

### DISK DRIVES

Japanese Half height, 80 track double sided disk drives by **TEAC, TOSHIBA** etc. Sold as **NEW** with 90 day guarantee **ONLY £125.00.**
**SUGART SA400** SS FH 35 TRK **£55.00**
**SIEMANS FDD100** SS FH 40 TRK **£75.00**
carriage on 5¼" drives **£5.50**
Brand **NEW** metal cases with internal PSU etc for above drives, below cost!!!
**DSKC 1** for 2 HH or 1 FH 5¼" drive **£39.95** + pp £4.50 **DSKC 2** for 1 HH or 1 FH 5¼" drive **£29.95** + pp £4.50

8" Refurbished standard units.
**SUGART 801** SS £175.00 + pp £8.50
**SUGART 851** DS £250.00 + pp £8.50
**DRE 7100** SS as seen £125.00
**TWIN SUGART 851's** in smart case, complete with PSU etc, £595.00
8" DRIVE PSU for 2 drive units £45.00

Hard Disk Drives
**DRE/DIABLO** Series 30 2.5 Mb front load, **£525.00**, Exchangeable version £295.00
**ME3029** PSU for above £95.00
**DIABLO 44/DRE4000A, B** 5+5 Mb from £750.00
**CDC HAWK** 5+5 Mb £795.00
**CDC 9762** 80 Mb RM03 etc £2500.00
**PERTEC D3422** 5+5 Mb £495.00
**RODIME 10MB ST506** Winchester NEW £299.00
**BASF 6172** 23Mb Winchesters, as seen £199.00

Carriage on other drives £10.00.

Unless stated all drives are refurbished with 90 day guarantee. Many other drives and spares in stock – call sales office for details.

### MODEMS

Join the communications revolution with our super range of **DATA MODEMS**, prices and specifications to suit all applications and budgets . . .

**BRAND NEW** State of the art products.
**DACOM DSL2123** Multi standard 300-300, 1200-75 Auto answer etc. **£268.00**
**DACOM DSL2123AD** Auto dial, smart modem with multi standard **AUTO SPEED** detect, and data buffer with flow control etc. **£365.00**
**DACOM DSL2123GT** The **CREAM** of the intelligent modems, auto dial, auto call, index, buffer etc etc. **£498.00**
**STEEBECK SB1212 V22 1200** baud **FULL DUPLEX**, sync or async, optional auto dial, **£465.00**
**TRANSDATA 307A** Acoustic coupler **300** baud full duplex, originate only, **RS232** **£49.00**

Ex **BRITISH TELECOM** full spec, CCITT, ruggedised, bargain offers. Sold **TESTED** with data. Will work on any **MICRO** or system with **RS232** interface.
**DATEL 2B** 300 Baud Modem see **SPECIAL OFFER.**
**MODEM 13A** 300 baud unit, only 2" high fits under phone. **CALL** mode only £45.00
**MODEM 20-1. 75-1200 baud. Compact unit for use as subscriber end to PRESTEL, TELECOM** GOLD, **MICRONET** etc. **£39.95** + pp £6.50
**MODEM 20-2** 1200-75 baud. Same as 20-1 but for computer end, **£65.00** + pp £6.50
**DATEL 2412** Made by SE labs for BT this two part unit is for **synchronious** data links at 1200 or 2400 baud using **2780/3780** protocol etc. Many features include 2 or 4 wire working, self test, auto answer etc.
**COST OVER £800** Our price **ONLY £199** + pp £8.00
**DATEL 4800, RACAL MPS4800** baud modem, EX BT good working order, **ONLY £295.00** + pp £8.00

SUMMER OFFER
**MODEM TG2393.** Ex BT, Up to 1200 baud, full duplex over 4 wire or half duplex over 2 wire line. **ONLY £85.00 PER PAIR** + pp £10.00

For more information
CONTACT OUR SALES OFFICE

### COOLING FANS

Keep your hot parts **COOL** and **RELIABLE** with our range of **COOLING FANS**
**ETRI 126LF21** 240v 5 blade equipment fan Dim. 80 x 80 x 38mm **£9.95**
**ETRI 88XUOI** Dim. 92 x 92 x 25mm 240v equipment fan, complete with finger guard **NEW £9.95**
**GOULD JB-3AR** Dim. 3" x 3" x 2.5" compact very quiet running 240v operation. **NEW £6.95.**
**BUHLER 69.11.22** 8-16v DC micro miniature reversible fan. Uses a brushless servo motor for extremely high air flow, also silent running and guaranteed 10,000 hr life. Measures only 62 x 62 x 22mm. Current cost £32.00. OUR PRICE **ONLY £12.95** complete with data.
**MUFFIN-CENTAUR** standard 4" x 4" x 1.25" fans 110v OR 240v **NEW** at **£10.50** or tested EX EQUIPMENT 240v £6.25 or 110v £4.95.
**1000's** of other fans **Ex Stock.**
Call for Details. Post & Packing on all fans £2.00.

### QWERTY KEYBOARDS

Manufacturer's **BRAND NEW** surplus.
**ALPHAMERIC 7204/60** Full travel **ASCII**, 60 key with parallel output and strobe. £39.95
**DEC LA34** Uncoded keyboard with 67 quality gold plated switches on X-Y matrix – ideal micro conversions etc. **£24.95**
**AMKEY MPNK-114** Superb word processor chassis keyboard on single **PCB** with 116 keys. Many features such as On board Micro, Single 5v rail, full **ASCII** coded character set with 31 function keys, Numeric keypad, cursor pad and **9600** baud **SERIAL TTL ASCII OUTPUT!! ONLY £69.00** with data.

Carriage on all Keyboards £3.50

### PLESSEY VUTEL

Manufactured by **PLESSEY** Ltd this compact unit, only slightly larger than a telephone, features an all in one **TELEPHONE**, 24 x 40 character CRT screen, **VIEWDATA – PRESTEL** modem, Keypad and electronics to run as a fully fledged **PRESTEL** terminal or telephone. Ready to plug direct into a BT 600 type jack socket and instantly connect you to **PRESTEL** etc. Many other features include Memory dialling, Recall button, Off line screen data storage, Picture expand, Standard Mullard LUCY chip set, Integral 5" JVC crt monitor, etc etc. Designed to sell to the **EXECUTIVE** at over £600!! But from **DISPLAY, BRAND NEW AND BOXED** at only £99.00 for **DTMF** tone dial or **£140.00** for standard **DIAL PULSE** version.
Carr. £8.00.

### COLOUR AND MONOCHROME MONITOR SPECIALS

**'SYSTEM ALPHA' 14" COLOUR MULTI INPUT MONITOR** made in the UK by the famous **REDIFFUSION Co.** for their own professional computer system this monitor has all the features to suit your immediate and future monitor requirements. Two video inputs: **RGB** and **PAL** Composite Video, allow direct connection to the **BBC** and most other makes of micro computers and **VCR's**. An internal speaker and audio amplifier may be connected to your systems output or direct to a VCR machine, giving superior sound quality. Many other features included PIL tube, Matching **BBC** case colour, Major controls on front panel, Separate Contrast and Brightness – even in **RGB** mode, Two types of audio input, Separate Colour and audio controls for Composite Video input, **BNC** plug for composite input, 15 way 'D' plug for **RGB** input, modular construction etc etc.

This Must be **ONE OF THE YEAR'S BEST BUYS**
Supplied **BRAND NEW** and **BOXED**, complete with DATA and 90 day guarantee.
**SUPPLIED BELOW ACTUAL COST – ONLY £149.00**

**DECCA 80 16" COLOUR** monitor. **RGB** input.
Little or hardly used manufacturer's surplus enables us to offer this special converted **DECCA RGB** Colour Video TV Monitor at a super low price of only **£99.00**, a price for a colour monitor as yet unheard of!! Our own interface, safety modification and special 16" high definition **PIL** tube, coupled with the tried and tested **DECCA 80** series TV chassis gives 80 column definition and picture quality found only on monitors costing **3 TIMES OUR PRICE**. In fact, **WE GUARANTEE** you will be delighted with this product, the quality for the price, has to be seen to be believed. Supplied complete and ready to plug direct to a **BBC MICRO** computer or any other system with a **TTL RGB** output. Other features are: internal speaker, Modular construction, auto degaussing circuit, Attractive **TEAK CASE**, compact dimensions only 52cm W x 34 H x 24 D, 90 day guarantee. Although used, units are supplied in **EXCELLENT** condition, **ONLY £99.00** + Carr.
**DECCA 80, 16" COLOUR** monitor. Compositve video input. Same as above model but fitted with Composite Video input and audio amp for **COMPUTER**, VCR or **AUDIO VISUAL** use. **ONLY £99.00** + Carr.
**REDIFFUSION MARK 3, 20"** Colour monitor. Fitted with standard 75 ohm composite video input and sound amp. This large screen colour display is ideal for shops, schools, clubs and other **AUDIO VISUAL** applications. Supplied in AS NEW or little used condition **ONLY £145.00** + Carr.

**BUDGET RANGE EX EQUIPMENT MONOCHROME** video monitors.
All units are fully cased and set for 240v standard working with composite video inputs. Units are pre tested and set up for **80** column use on **BBC** micro etc. Even when MINOR screen burns exist – normal data displays are unaffected.
**12" KGM 320-1** B/W high bandwidth input, will display up to 132 x 25 lines. £32.95
**12" GREEN SCREEN** version of **KGM 320-1** Only **£39.95**
**9" KGM 324 GREEN SCREEN** fully cased very compact unit Only **£55.00**
**9" HITACHI VM-906E/K** Black and White screen **£49.95**

Carriage and insurance on all monitors **£10.00**

### D.C. POWER SUPPLY SPECIALS

**GOULD OF443** enclosed, compact switch mode supply with DC regulated outputs of +5v @ 5.5a, +12v @ 0.5a, -12v @ 0.1a and -23v @ 0.02a. Dim 18 x 11 x 6 cm. 110 or 240v input. **BRAND NEW** only **£14.95**
**GOULD G6-40A** 5v 40 amp switch mode supply NEW £130.00
**GREENDALE 19A-BOE** Switch mode 60 watt open PCB with a fully regulated DC output of 5v @ 6 amps, and three semi regulated outputs of +12V, -12V +15V @ upto 1 amp. Dim only 11 cm x 20 cm x 5.5 cm. Similar to RS 591-994. 110 or 240v AC input. **TESTED** ex equipment. **Only £24.95**
**AC-DC** Linear **PSU** for **DISK** drive and **SYSTEM** applications. Constructed on a rugged ALLOY chassis to continuously supply fully regulated DC outputs of +5V @ 3 amps, -5V @ 0.6 amps and +24v @ 5 amps. Short circuit and overvoltage protected. 110 or 240 V AC input. Dim 28 x 12.5 x 7 cm **NEW £49.95.**
Carriage on PSU's £3.00

### SPECIAL 300 BAUD MODEM OFFER

Another **GIGANTIC** purchase of these **EX BRITISH TELECOM, BRAND NEW** or little used 2B data modems allows US to make the **FINAL REDUCTION**, and for **YOU** to join the exciting world of data communications at an **UNHEARD OF PRICE OF ONLY £29.95**. Made to the highest **POST OFFICE APPROVED** spec at a cost of hundreds of pounds each, the 2B has all the standard requirements for data base, business or hobby communications. All this and more!!

- 300 baud full duplex
- Full remote control
- CCITT tone standards
- Supplied with full data
- Modular construction
- Direct isolated connection

NOW ONLY £29.95

- CALL, ANSWER and AUTO modes
- Standard RS232 serial interface
- Built in test switching
- 240v Mains operation
- 1 year full guarantee
- Just 2 wires to comms. line

BT 600 Jack plug and cable £2.25   Carriage and Ins. £10.00

### VDU TERMINALS

Standard VDU data entry terminals at give away prices!!
**QUME QVT108.** Current product, state of the art terminal with detachable keyboard, 12" green screen, 2 page RAM, **TVI 925** emulation, 25 x 80, Clock, Swivel and tilt base, Printer port, Function keys etc. **BRAND NEW** and BOXED AT ALMOST **HALF PRICE** Only **£425.00**
**AJ510 – EX RENTAL**, Z80 controlled, 15" green screen 24 x 80 display, graphics, cursor addressing, printer port etc. Very good condition **TESTED** complete with manual only £225.00.
**ADDS 520** – Dumb terminal, used, 12" b/w screen RS232 interface and printer port. **TESTED. ONLY £125.00**
Carriage on terminals £10.00
100's of other terminals in stock,
**CALL** for more details.

DISPLAY
-ELECTRONICS-

All prices quoted are for U.K. Mainland, paid cash with order in Pounds Sterling PLUS VAT. Minimum order value ***£2.00***. Minimum Credit Card order ***£10.00***. Minimum BONA FIDE account orders from Government Depts., Schools, Universities and established companies ***£20.00***. Where post and packing not indicated please ADD £1.00 + VAT. Warehouse open Mon-Fri 9.30-5.30. Sat 10.30-5.30. We reserve the right to change prices and specifications without notice. Trade, Bulk and Export

**32 Biggin Way, Upper Norwood, London SE19 3XF**
**Telephone 01-679 4414 Telex 894502 Data 01-679 1888**

ARE YOU READY FOR
BRAIN TO BRAIN COMBAT
DOCTOR WHO
AND THE MINES OF TERROR
MICROPOWER
IN ASSOCIATION WITH THE BBC

FORM Zi (Ur₄ (Λ¹³C₃H₅N)₈ O₄ Fl₈) OH₄ · 16H₂O } ◆ ● ○ ○ ○ ● ○ ○ ○ 2nd Moon Rijar. ●

Use invisible cat + code: string ◇ etc. Full cerebral combat status needed all times. ≷ Halt Heatonite prod. ▶ Access via VDU. Programme *concealed* in game Pack ☐ *Who would think of a Police box?*

● Blue print (part) supplied. Ky-Al-Nargath construction. ≅ MEGA SECURE !!! Madrag [genetically boosted saurian] + psycho

▶ Time Instant Replay Unit ✚ brain ⊇ (Who's?)

– robotics + techno trickery ≡ Force futile. ▶ *Weapon Skills NA* ◀

– C𝒽A os weapon. ✧ *The Master reports 'promising' results.* (LIVE ALIEN *cortical preparation.*) ○ Mine/Factory S *ential* { Heatonite

*Machine skill* VITAL. Doctor: ultimate risk scenario. Your intervention urgently requested. ??? HELP? ??? *Disable TIRI* ▶ *Regain*

SPECTRUM COMMODORE £14.95
AMSTRAD (CASSETTE)
(ROM/CASSETTE) £18.95

# INTEGRATION THE FACTS

INTER-SHEET and INTER-CHART are the first of a new generation of integrated packages for the BBC Micro. They are more powerful and much easier to use than any other similar application program.

The ROM-LINK concept is unique to this range of programs; it ensures that all ROM-LINK programs are totally compatible and truly integrated.

The word 'integrated' has been much abused recently. In our eyes 'integrated' should mean that all programs in the range should share a common data format, that it should be possible to transfer data directly from one program to another (not just by saving and loading) and it should be possible to have multiple programs resident in the machine at once. The integrated programs in the ROM-LINK series are the only ones that can do this.

The ROM-LINK system allows up to 16 packages to be resident in memory at the same time. It makes no distinction between any of the packages, so that you could have up to 16 separate spreadsheets stored in memory or (more usefully) a few spreadsheets, a few graphs and a couple of documents being word processed. It is a simple matter to transfer data from any package into the one in current use, and because the packages are resident in memory, the data transfer is very fast. It is also possible to use data from other packages without actually transferring, thereby saving memory.

Put simply, this means that INTER-SHEET can use multiple spreadsheets and use data from one sheet in another sheet, and INTER-CHART can plot graphs using data taken directly from a spreadsheet. When INTER-WORD and INTER-BASE are available then these will be able to use data from the other packages in the same way.

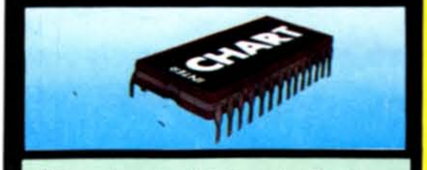
FACTS

## INTER-CHART

### The chart and graph plotting program

This general purpose graph and chart plotting program allows the user to display data in the most easily understood manner—graphically.

Two quite distinct sorts of graphs are catered for. 'Labelled' graphs that always have fixed increments on the X axis like yearly sales figures, and 'scaled' or scatter graphs. These allow both the X and Y values to be specified.



Data can be entered into the system from three distinct sources: Typing at the keyboard is the simplest method, but data can be read from ASCII files produced by WORDWISE, VIEW or a programming language such as BASIC. Because INTER-CHART is ROM-LINK compatible it can also import its data directly from other ROM-LINK packages such as INTER-SHEET.

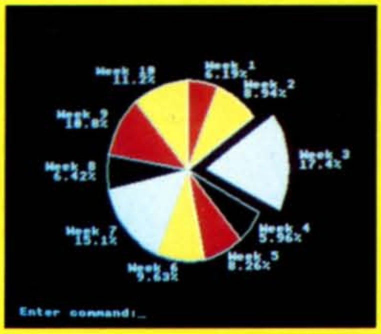
Once the data has been entered a straightforward editor allows any previous data to be altered or new values to be inserted at any position.

TEXT WITH GRAPHS: Labels are normally printed along the X-axis for lines and bars. Pie charts have their labels and values printed around the chart. These may be optionally switched off. With a pie chart the values may be replaced with a percentage figure. All graph displays can have additional labels or messages printed at any position on the screen using a powerful label editor. This allows headings to be easily added to graphs. These labels are stored with each graph when saved.

COMPATIBLE WITH: All shadow RAM boards and the 6502 2nd processor. However the ROM-LINK facilities are not available when using a 2nd proc., these include multiple INTER-CHARTS and direct data transfer from other ROM-LINK programs.

**PRICE: £36.80 incl.**

INTER-CHART allows up to 16 graphs to be held in memory at the same time as one 'package'. Each graph is named and, once entered, any named graph can be selected from a simple menu display.



```
Enter command:_
```

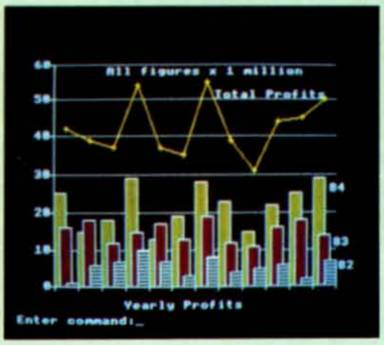
SCREEN DISPLAY: The graphs can be displayed in any of the BBC's graphics modes. The colours of the bars, lines or segments can be altered in a simple table of colours. This also allows special striped colour combinations and for bar charts a variety of cross hatching styles is available. It is also possible to use a VDU19 statement to alter the colour palette.

DISPLAY OPTIONS: Where appropriate (not pies, etc) either axis can be displayed as a log or linear scale, and there is an option to display dotted graduation lines on either axis. Pie segments and bars can be highlighted (segment 'pulled out').

PRINTERS: INTER-CHART has a built in screen dump routine for all EPSON matrix printers and compatibles. It is possible to use other screen dump routines from within (or external to) INTER-CHART for other printers or plotters.

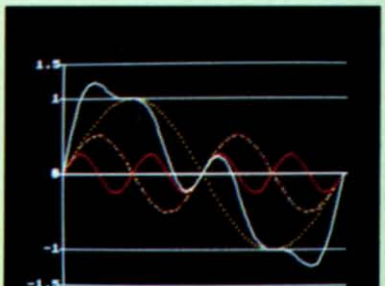
FILING OPERATIONS: Any named graph can be saved or loaded individually to disc or cassette, or all graphs can be saved together in one file.

GRAPH TYPES: INTER-CHART supports the three main graph types, lines, bar charts and pie charts. Scatter graphs are also catered for and can be displayed as points or lines.



```
Enter command:_
```

SCALING: INTER-CHART automatically scales the graph display to cover the full range of values entered. INTER-CHART can cope with numbers in the range 2E-39 to 2E+38. It is possible however to force the scale independently on the X and Y axis to show any specified range, including the option for log scales on either or both axes.



```
Enter command:_
```

## FUTURE RELEASES

Both INTER-SHEET and INTER-CHART are available now. INTER-BASE and INTER-WORD are under development at the moment, and are likely to be released in early 1986. Both are fully ROM-LINK compatible so that they will be totally integrated with the others in the range.

INTER-WORD is an 80 and 105 column word processor (not 40 columns). This will be a 'WYSIWYG' word processor showing the page on screen exactly as it would appear on the page, including page breaks, headings/footings and centered lines, justification, margins, etc. It will also handle 'continuous' documents on disc up to the capacity of your filing system.

Like all of our products this will be smooth and very fast in operation, and of course very easy to use. Editing operations will be similar to WORDWISE but this is not totally WORDWISE compatible. There will be an exchange arrangement available to WORDWISE owners—more details available nearer the release date.

**AVAILABILITY: Winter 85/86**
**PRICE: Approx. £49.00 + VAT**

INTER-BASE will simply be the most powerful database available. This will operate with all disc filing systems and have a very large data handling capacity. It will contain a powerful BASIC-like programming language with full string and mathematical operations.

This will work at 2 levels, a simple user interface will allow card-index like operations but, via the programming language, the system can be easily tailored to the individual needs. Up to 250 fields per record, each field up to 32K long. This would enable the user to store complete documents in the database. Variable length fields and records.

**AVAILABILITY: Early 1986**
**PRICE: Approx. £59.00 + VAT**

# INTER-SHEET

The electronic spreadsheet program

FACTS

**FILING OPERATIONS:** Load and Save entire sheet. Save specified part of sheet. Load part of sheet to any sheet position. Spool sheet to file. Save all ROM-LINK packages. Load all ROM-LINK packages.

**IMPORT/EXPORT:** Export any part of sheet for use in word processors. Import sheets created on word processors. Import data directly from other ROM-LINK packages.

**PRINTING:** Print all or specified part of worksheet. Print with or without sheet borders. Print with or without held lines (windowing). Sheets titles can be printed and control codes can be sent to the printer. Print all formulae. The pound sign code can be altered to a sequence of codes for different printers.

**AUTO-STEP:** Whenever an entry has been made the cursor can automatically move one box up, down, right or left.

**CELL DISPLAY:** Any box (cell) can be displayed left or right justified. Labels can also be centered. Numbers may be displayed in three formats, exponent, fixed or general format. The number of digits is controllable from 0 to 10.

**LOCKING:** Any box, row or column or all boxes can be locked to prevent accidental alteration.

**LABELS:** Formulae can refer to other boxes in the normal way (e.g. A1 or G5) but can also refer to boxes in a much more meaningful way via labels (e.g. JAN SALES), the box referred to is at the intersection of the column and row of the specified labels. Labels are not restricted to being placed on the borders of the sheet only.

**REPLICATION:** Any box or area can be copied to any other box or area on the sheet, giving total flexibility. The replication is very fast—see comparisons. Single key operations for inserting or deleting a row or column. Formulae can automatically be altered, if desired, relative to their new position.

**OPTIONS:** A variety of spreadsheet defaults can be altered, such as the default box justification, number format, sheet area. Screen colours are easily alterable.

**WINDOWING:** A unique system that allows any row or column (or multiple rows and columns) of the sheet to appear at a fixed position on screen, still allowing the sheet to scroll underneath. Far easier to use and more flexible than other windowing systems.

The first published review of INTER-SHEET says:

"... It offers higher capacities than any previous Beeb spreadsheet, but it runs significantly faster than Lotus 1-2-3 and Symphony on the IBM-PC,"

"INTER-SHEET is quicker, has more features and is cheaper than either of its competitors. If the remainder of the "Inter-" series are as good as this Acornsoft and the rest better look to their laurels. Software of such quality can only make the Beeb even more attractive as a business machine."

Gordon Taylor—A&B Computing Sept. 85

PRESS

**COMPATIBLE WITH:** Shadow RAM boards such as the Aries B20 and Watford electronics 32K RAM board. Because the ROM-LINK system needs to switch ROMs INTER-SHEET is not compatible with the 2nd processor, although a HI version of INTER-SHEET will be available for the 6502 2nd processor (No ROM-LINK facilities and no 105 screen mode). INTER-SHEET is supplied in 2 ROMs, but if you only have 1 socket then only the ROM-LINK facilities are lost (multiple spreadsheets etc).

**For the BBC MICRO**
Available from all good software dealers or directly from ourselves

INTER-SHEET and the rest of the ROM-LINK series belong to the 2nd generation of application programs for the BBC Micro. They are larger, more powerful and easier to use than any previous products of this sort.

ROM-LINK

INTER-CHART
INTER-CHART
INTER-CHART
ROM

INTER-SHEET offers many quite unique features.

1. The fastest spreadsheet—see comparison box
2. The largest capacity—see comparison box
3. 40, 80 and special 105 column screen mode
4. Multiple spreadsheets in memory at once
5. Data transfer between sheets in memory
6. Data transfer to and from word processors such as WORDWISE and VIEW
7. Menu operation and fully prompting commands
8. Complete documentation. 2 manuals, an introduction and a reference, are supplied along with a quick reference card.
9. Will integrate directly with INTER-CHART and other ROM-LINK compatible products.

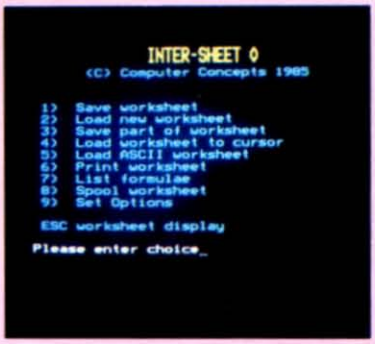
Some further facts about INTER-SHEET:

**CURSOR MOVEMENT:** WORDWISE-like cursor movement allowing the user to move left or right one box, one screenful or to the extremes of the used sheet area. A further command allows immediate movement to any specified box.

**SCREEN DISPLAY:** Single key switch for 40, 80 and a special 105 column screen mode. This allows much more of the spreadsheet to be visible on screen at once. The 105 column mode requires no special monitors—if you can read the 80 column mode then the 105 will work perfectly well.

**SHEET SIZE:** 64 columns by 255 rows. Each box can hold up to 80 characters. Column widths are variable up to 31 characters wide. There is no gap between boxes so labels can continue across boxes.

**MATHS:** A full range of maths functions is included. There are also additional special spreadsheet functions such as AVERAGE, COUNT, IF . . ., LOOKUP, MAX, MIN, SUM, BOX and SQRS (sum of the squares). Numbers can range from 2E-39 to 2E+38 and can be printed to 10 significant figures.



```
INTER-SHEET 0
(C) Computer Concepts 1985

1)  Save worksheet
2)  Load new worksheet
3)  Save part of worksheet
4)  Load worksheet to cursor
5)  Load ASCII worksheet
6)  Print worksheet
7)  List formulae
8)  Spool worksheet
9)  Set Options

ESC worksheet display

Please enter choice_
```

## ROM BASED SOFTWARE FOR THE BBC MICRO

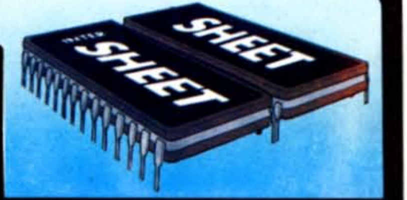
## Spreadsheet comparisons

| Times in seconds | VIEW-SHEET | ULTRA-CALC 2 | INTER-SHEET |
|---|---|---|---|
| Replicate SIN(PI) into boxes A1 to Z50 | 66 | 65 | 7 |
| Recalculate the above | 28 | 33 | 5 |
| Number of bytes free with above sheet | 4664 | 1415 | 8400 |
| Price (Exclusive of VAT) | £52.00 | £69.13 | £49.00 |

**PRICE: £56.35 incl.**

Computer Concepts

Gaddesden Place, Hemel Hempstead,
Herts HP2 6EX (0442) 63933



Access

VISA

# We thought it was about time we put you in the picture.

File
Edit
Goodies
Options
Grid
Load Pat
wow!

When we introduced our AMX Mouse to BBC Micro users, the response was phenomenal.

And no wonder!

It was regarded as 'pushing the BBC to its limits' and hailed by the press as 'probably the best input device that has appeared recently'. The AMX Mouse brought to BBC Micro users the same sophisticated, positive control that had, until then, been the province of the more expensive computers, like the Macintosh.

Now we announce a new enhanced software package which, can be used with a traditional keyboard or joystick but truly comes into its own when used with the AMX Mouse.

AMX Super ROM and Super Art adds colour to the features of the original AMX ROM, on a new 16K ROM.

It dramatically extends the original AMX ROM facilities to include Pull Down Menus, over lapping colour windows, colour patterns and an extended Icon set in all graphic modes.

Specially written to be usable with the vast majority of BBC Systems including 2nd processors, the Aries RAM Board, the BBC + Shadow mode, tape, DFS and ADFS.

The kernel of the Super Art program is included in the 16K ROM, providing tape and disc users with a Mode 1 colour drawing program.

But Super Art really comes into its own when used on a disc based system; a host of additional facilities can be selected direct from the screen.

Colour pictures can be created in dot resolution up to A4 size by scrolling the screen window, over the picture.

Other facilities include colour pattern editing – use of icons, additional text styles, various copy facilities and a superb colour Zoom.

AMX MOUSE
FOR THE BBC MICRO AND B+
AMX SUPER ART
WITH THE AMX SUPER ROM
AMX ART

Pictures can be printed out in colour (Integrex) or shades of black and grey on Epson compatible printers.

The results can be astonishing! – you can even store your finished 'masterpieces'.

The AMX Icon Designer facility gives you further freedom to design and store your own custom icons for use in your own programs.

This fabulous new package costs only £89.95 – a price as remarkable as the package itself – and includes a fully illustrated operating manual.

If, however, you are afraid of mice, you can purchase just the software package plus the 16K Super ROM for just £49.95.

You will still achieve some pretty remarkable results using your keyboard or joystick – not nearly as good as with the Mouse of course – but you can always add one later on for just £40.

Then you'll really be 'in the picture'.

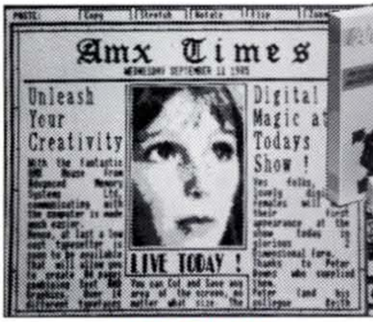
**AMX MOUSE**

IMAGINATION AT YOUR FINGERTIPS.

BOTH THESE EXCITING PACKAGES ALONG WITH OUR SUPERB RANGE OF AMX ROM AND SUPER ROM COMPATIBLE SOFTWARE ARE AVAILABLE FROM ALL GOOD COMPUTER DEALERS OR BY SENDING CHEQUE OR P.O. TO FREEPOST ADVANCED MEMORY SYSTEMS LTD., GREEN LANE, APPLETON, WARRINGTON, WA4 5NG.

FOR INSTANT ACCESS OR VISA ORDERS, RING (0925) 602959/602690.

# Now you can stretch your imagination, without stretching your budget.



Amx Times

WEDNESDAY SEPTEMBER 11 1985

Unleash Your Creativity

Digital Magic at Todays Show !

LIVE TODAY !

AMX PAGEMAKER
£49.95 INC VAT, 2 ROMS + DISC

From Advanced Memory Systems comes an irresistable selection of Icon driven software that AMX Mouse, ROM and AMX Super ROM owners can really get their teeth into!

Seven incredible programs, so comprehensive, they will more than satisfy even the most demanding BBC Micro user and when coupled with the AMX Mouse will broaden the horizons of the BBC Micro to new, undreamed of standards of sophistication.

## AMX PAGEMAKER.

A fantastic high resolution A4 Typesetting and Artwork system.

Comprising 2 ROMS (8K and 16K) 'Pagemaker' features a fast scrolling A4 page.

There is a wide selection of typefaces and user definable fonts.

You can load in Wordwise and View files or type directly onto screen.

An incredible 'Cut and Paste' facility includes copying, rotating, stretching and zooming.

For the professional touch there is N L Q high quality dump, and you can dump any part of, or full A4 page.

## AMX 3D ZICON.

Now, with a 3D ZICON you can transform three dimensional vector data and translate them into on-screen graphics.

You can Print or Plot graphics to suitable peripherals and produce output suitable for other AMX programs such as ART – UTILITIES and Paintpot.

There is even the facility to sketch in two dimensions and convert to three dimensions and auto swaps generator.

Some interesting example objects on file include – helicopter – jet plane and dodecahedrom.

## AMX DATABASE.

Database is a brand new super filing program featuring 1000 records and unlimited fields per record.

It has a powerful search and sort facility and user friendly edit and display.

In fact it is probably the most advanced user friendly database available today.

Special features include: User definable screen format for record display – random access files – super fast sort – flexible printer dump and screen display.

## AMX XAM.

A brand new and exciting educational program with maximum flexibility, allowing a multitude of options and variations.

With XAM you can create a multiple choice exam which would not be alterable by the examinee.

And you can incorporate within the questions, your own pictures, created on AMX ART, building the finished picture into the quiz and providing an extra and fascinating aspect to the examination.

## AMX DESK.

The complete home or office acquisition.

You will wonder how you ever managed without AMX Desk.

Just point your Mouse and select the following additional aids:

MEMO-PAD for up to three pages of text

TELEPHONE/ADDRESS BOOK with 200 or 400 scrolling entries

DIARY with three months calender

ALARM to remind you about appointments

CALCULATOR – Yes! A full function calculator that cannot be lost or suffer flat batteries, and any window can be dumped to your printer at the touch of a button.

## THE ORIGINAL AMX ART PLUS UTILITIES.

Now available as a single package – two of AMX's most popular programs.

AMX ART is a superb mode 4 graphics program, making full use of windows, icons, menus and pointers, it allows you to create your own pictures and the host of graphic features in AMX UTILITIES including a fantastic zoom facility for accurate amendments to your ART pictures – one dot becomes a character.

You can also move, copy, rotate, reflect, enhance circles, draw ellipses and arcs, even print icons.

Border can be added and pictures stripped and centred for saving and printing. All pictures can be loaded into AMX PAGEMAKER, AMX 3D ZICON, AMX XAM, AMX PAINT POT, and AMX SUPER ART.

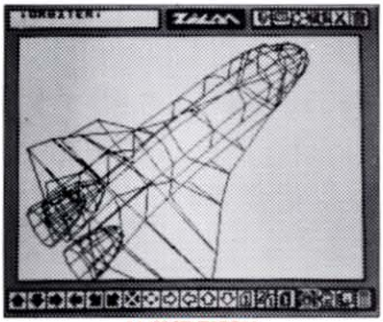
## AMX PAINT POT.

The pictures you have created with AMX ART and enhanced with AMX Utilities can now be coloured in, using PAINT POT.

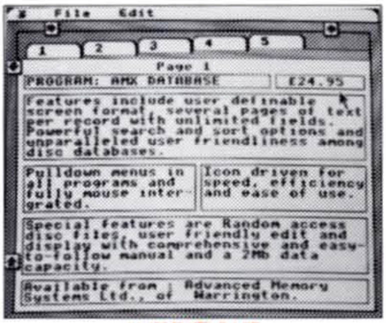
They will burst into life with rich, vibrant colours, and with a palette of 256 different shades you should not be short of inspiration.

You can even store up to 20 Illustrations in Picture Show mode, then display them in sequence.

To start you off we have included eight exciting pictures in the program.



AMX 3D ZICON
£24.95 INC VAT, DISC



Page 1

PROGRAM: AMX DATABASE £24.95

Features include user definable screen format, several pages of text per record with unlimited fields. Powerful search and sort options and unparalleled user friendliness among disc databases.

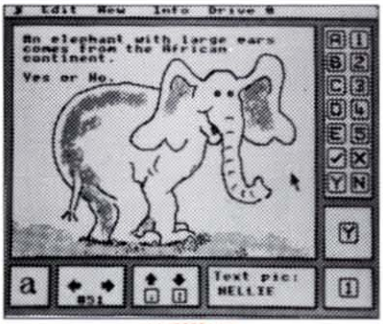
Pulldown menus in all programs and fully mouse intergrated.

Icon driven for speed, efficiency and ease of use.

Special features are Random access disc files, user friendly edit and display with comprehensive and easy-to-follow manual and a 2Mb data capacity.

Available from : Advanced Memory Systems Ltd., of Warrington.

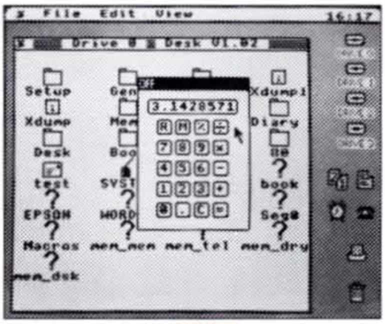
AMX DATABASE
£24.95 INC VAT, DISC



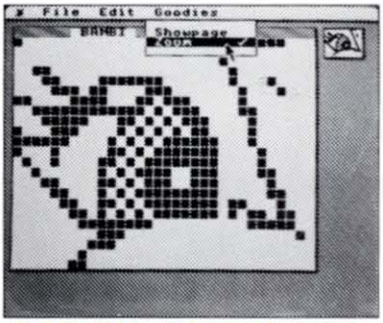
An elephant with large ears comes from the African continent.

Yes or No.

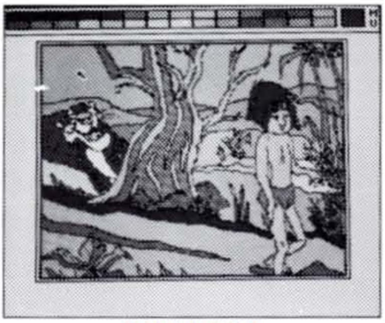
AMX XAM
£24.95 INC VAT, DISC



AMX DESK
£24.95 INC VAT, DISC



THE ORIGINAL AMX ART PLUS UTILITIES
£14.95 INC VAT, DISC



AMX PAINT POT
£14.95 INC VAT, DISC

**AMX SOFTWARE**

IMAGINATION AT YOUR FINGERTIPS.

ALL THESE EXCITING AMX ROM AND AMX SUPER ROM COMPATIBLE SOFTWARE PACKAGES ARE AVAILABLE FROM GOOD COMPUTER DEALERS OR BY SENDING CHEQUE TO PO TO FREEPOST ADVANCED MEMORY SYSTEMS LTD, GREEN LANE, APPLETON, WARRINGTON WA4 5NG.

FOR INSTANT ACCESS OR VISA ORDERS TELEPHONE (0925) 602959/602690.

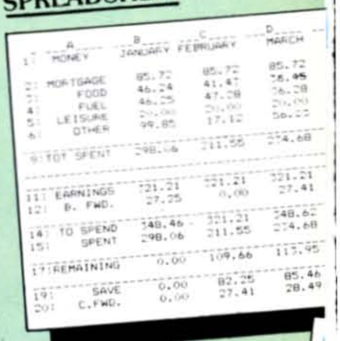
# QUICK TO LEAR

## THAT'S...

# MINI OFFICE

FINALIST
MICRO
BRITISH COMPUTING
AWARDS
1985

**SPREADSHEET**



```
     A____      B____    C____    D____
1:  MONEY     JANUARY FEBRUARY  MARCH

2:  MORTGAGE    85.72    85.72    85.72
3:      FOOD    46.24    41.47    76.45
4:      FUEL    46.25    47.28    36.28
5:   LEISURE    20.00    20.00    20.00
6:     OTHER    99.85    17.12    56.22
------------------------------------------
9:TOT SPENT    298.06   211.55   274.68
------------------------------------------
11:  EARNINGS  321.21   321.21   321.21
12:   B. FWD.   27.25     0.00    27.41
------------------------------------------
14: TO SPEND   348.46   321.21   348.62
15:    SPENT   298.06   211.55   274.68
------------------------------------------
17:REMAINING     0.00   109.66   113.95
------------------------------------------
19:     SAVE     0.00    82.25    85.46
20:   C.FWD.     0.00    27.41    28.49
```

## *JUST LOOK WHAT THIS PACKAGE CAN DO!*

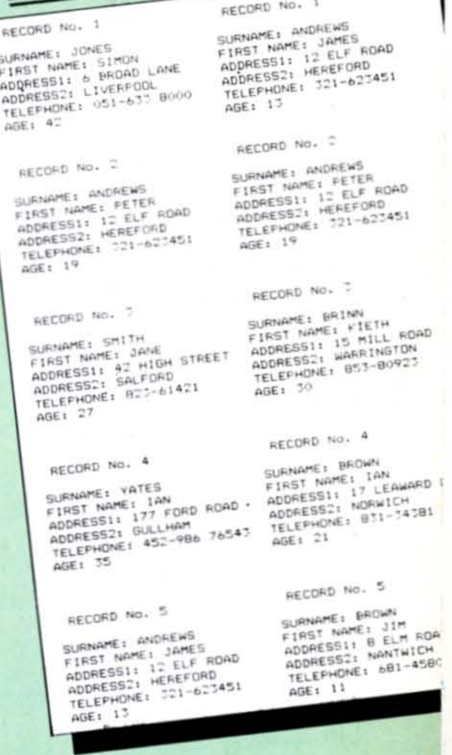
**WORD PROCESSOR** – Ideal for writing letters or reports! *Features:* Constant time display ● Constant word count (even shows words per minute) ● Normal or double-height text on screen or printout.

**SPREADSHEET** – Use your micro to manage your money! *Features:* Number display in rows and columns ● Continuous updating ● Update instantly reflected throughout spreadsheet ● Save results for future amendments.

**GRAPHICS** – Turn those numbers into an exciting visual display! *Features:* 3D bar chart ● Pie chart ● Graph.

**DATABASE** – Use it like an office filing cabinet! *Features:* Retrieve files at a keystroke ● Sort ● Replace ● Save ● Print ● Search.

**DATABASE**

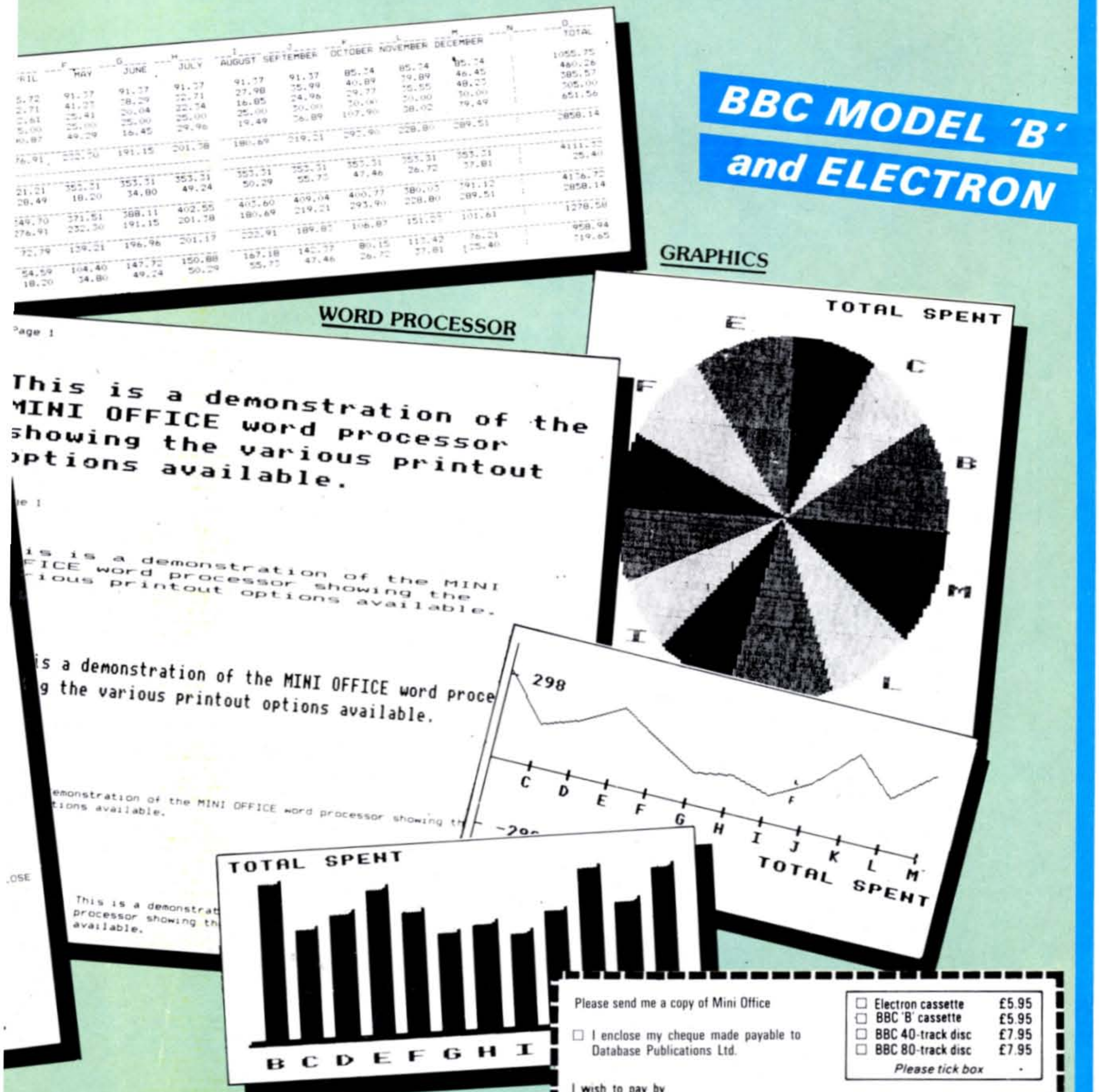


```
RECORD No. 1                      RECORD No. 1

SURNAME: JONES                    SURNAME: ANDREWS
FIRST NAME: SIMON                 FIRST NAME: JAMES
ADDRESS1: 6 BROAD LANE            ADDRESS1: 12 ELF ROAD
ADDRESS2: LIVERPOOL               ADDRESS2: HEREFORD
TELEPHONE: 051-633 8000           TELEPHONE: 321-623451
AGE: 42                           AGE: 13

RECORD No. 2                      RECORD No. 2

SURNAME: ANDREWS                  SURNAME: ANDREWS
FIRST NAME: PETER                 FIRST NAME: PETER
ADDRESS1: 12 ELF ROAD             ADDRESS1: 12 ELF ROAD
ADDRESS2: HEREFORD                ADDRESS2: HEREFORD
TELEPHONE: 321-623451             TELEPHONE: 321-623451
AGE: 19                           AGE: 19

RECORD No. 3                      RECORD No. 3

SURNAME: SMITH                    SURNAME: BRINN
FIRST NAME: JANE                  FIRST NAME: KIETH
ADDRESS1: 42 HIGH STREET          ADDRESS1: 15 MILL ROAD
ADDRESS2: SALFORD                 ADDRESS2: WARRINGTON
TELEPHONE: 823-61421              TELEPHONE: 853-80923
AGE: 27                           AGE: 30

RECORD No. 4                      RECORD No. 4

SURNAME: YATES                    SURNAME: BROWN
FIRST NAME: IAN                   FIRST NAME: IAN
ADDRESS1: 177 FORD ROAD           ADDRESS1: 17 LEAWARD
ADDRESS2: GULLHAM                 ADDRESS2: NORWICH
TELEPHONE: 452-986 76543          TELEPHONE: 831-34381
AGE: 35                           AGE: 21

RECORD No. 5                      RECORD No. 5

SURNAME: ANDREWS                  SURNAME: BROWN
FIRST NAME: JAMES                 FIRST NAME: JIM
ADDRESS1: 12 ELF ROAD             ADDRESS1: 8 ELM ROA
ADDRESS2: HEREFORD                ADDRESS2: NANTWICH
TELEPHONE: 321-623451             TELEPHONE: 681-458
AGE: 13                           AGE: 11
```

## ...and it's all at price of just

# N, EASY TO USE

## BBC MODEL 'B' and ELECTRON


MAY
JUNE
JULY
AUGUST
SEPTEMBER
OCTOBER
NOVEMBER
DECEMBER
TOTAL
GRAPHICS
TOTAL SPENT
E
C
F
B
M
I
L
298
C D E F G H I J K L M
TOTAL SPENT
TOTAL SPENT
B C D E F G H I

**WORD PROCESSOR**

age 1

This is a demonstration of the
INI OFFICE word processor
howing the various printout
ptions available.

e 1

is is a demonstration of the MINI
FICE word processor showing the
ious printout options available.

is a demonstration of the MINI OFFICE word proce
g the various printout options available.

emonstration of the MINI OFFICE word processor showing th
tions available.

OSE

This is a demonstrat
processor showing th
available.

# the unbelievable £5.95 CASSETTE

DATABASE SOFTWARE

Please send me a copy of Mini Office

☐ I enclose my cheque made payable to Database Publications Ltd.

| | |
|---|---|
| ☐ Electron cassette | £5.95 |
| ☐ BBC 'B' cassette | £5.95 |
| ☐ BBC 40-track disc | £7.95 |
| ☐ BBC 80-track disc | £7.95 |

*Please tick box*

I wish to pay by
☐ Access ☐ Visa No. ________ Expiry date ________

Signed ________

Name ________

Address ________

**POST TO:** Mini-Office Offer, Database Software,
68 Chester Road, Hazel Grove, Stockport SK7 5NY.

EU11

"THE HOST IN THE MACHINE"

M.U.D

MULTI USER DUNGEON

M.U.D is here!

If you have a computer, a modem and a telephone, you can play the world's largest multi-user game.

Phone the M.U.D-line now and we'll send you further details.
But hurry - the quicker you call us, the quicker you join us.

01-608 1173

M.U.D is a trade mark of British Telecommunications plc/M.U.S.E Ltd.

THE MICRO USER

NEWS

November 1985

# NEW PRODUCTS LINING UP FOR THE SHOW

A SURVEY has revealed that more than 20 leading peripheral manufacturers are currently working against the clock to launch new products at the Electron & BBC Micro User Christmas Show.

But such is the sensitivity in the marketplace, not one firm contacted would provide even the barest details of their top secret projects.

You'll have to wait for the show", one managing director told *The Micro User*. "After all, even a whisper in this highly competitive community can be disastrous.

"But you can rest assured that everyone will be doing their level best to be ready for the show, which is universally viewed as the highlight of the BBC Micro year".

The show is to be held from November 14 to 17 at the New Horticultural Hall, Westminster, the same venue as the last show, which then broke all previous records.

Advance ticket sales have never been heavier and most stands had been sold six months ago.

"This show has always proved to be the major BBC Micro event of the year", said Derek Meakin, joint managing director of Database Publications, the organisers.

"And this one should prove to be a bonanza – the biggest event featuring the BBC Micro that has ever been seen.

"No wonder the manufacturers are aiming so many new products for this show".

# Ex – Acorn executives launch a cut price micro chip plant

**A TRIO of key executives who helped put the BBC Micro on the map have launched a new company which may similarly revolutionise the British computing industry.**

Drawing heavily on technology previously developed by Acorn's back room boys, the team has set up a unique cut price chip fabrication plant.

Known as Qudos – Quick Design on Silicon – it is hoped that it will become the catalyst for a whole new generation of UK micro designers.

The venture has brought together Dr Herman Hauser, co-founder of Acorn, Dr Andy Hopper, the company's former research director, and Peter O'Keefe, ex-marketing boss.

Also joining them is Dr Haroon Ahmed, director of the microelectronics department at the world famous Cavendish Laboratory in Cambridge.

Initially aimed at colleges and small companies, the service will enable semi-custom chip design to be undertaken at dramatically reduced prices.

Qudos software is currently available for educational establishments for £500, when comparable software in the industry could cost up to £30,000.

This package will enable students to prepare first time designs – laying out the circuit, simulating and checking it – on a floppy disc.

For as little as £100 per chip a prototype can then be made by Qudos using an electron beam machine to etch directly into the silicon.

"What we are doing is offering the opportunity to design silicon chips to people who would never have been able to afford it before", Peter O'Keefe, the Qudos managing director, told *The Micro User*.

How has Qudos managed to achieve the dramatic price breakthrough?

"We already had the software available thanks mainly to Andy Hopper and the work done by Acorn's VLSI team", says Peter O'Keefe.

"The other major capital outlay in a project like this lies in the electron beam machines, which usually cost £1 million each.

"We have got around this by building our own. So we'll have three at a substantially reduced cost. All in all, we have drawn entirely on our own team's technological expertise to keep the costs down to a minimum".

Currently Qudos employs 12 people at its 5,500 sq ft headquarters building in the Science Park at Cambridge. However the company expects the payroll to have doubled by Christmas.

*AMX Pagemaker in action*

# AMX BRING OUT SUPER MOUSE

**ENTER Super Mouse. The add-on for the BBC Micro which won such critical acclaim that it reached the final of the Peripheral of the Year Award 1985 has finally met its match – an enhanced version of itself.**

Back room boys at Advanced Memory Systems of Warrington who produced the AMX Mouse have now come up with a package that takes it into new territory.

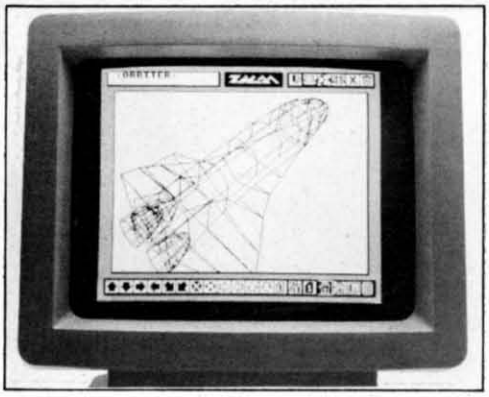
Combining the new AMX Super ROM and Super Art program, it extends the original facilities to include pull down menus, overlapping colour windows, colour patterns and an icon in all graphic modes.

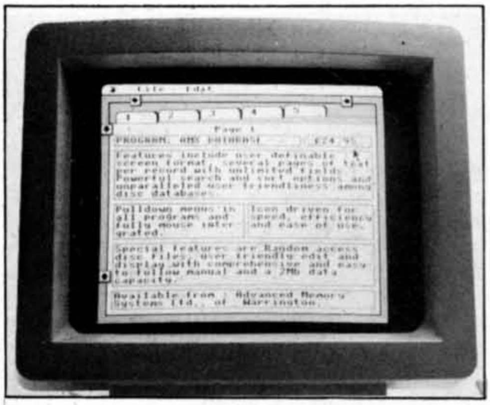
It has been specially written for most BBC systems including second processors, the Aries RAM Board, the BBC B+ Shadow mode, tape, DFS and ADFS.

The package will work even without the mouse itself. Priced at £49.95, it can be used with just the keyboard or joystick.

However AMS claims it really comes into its own when used with the

→




File Edit

Page 1

PROGRAM: AMS DATABASE £24.95

Features include user definable screen format, several pages of text per record with unlimited fields. Powerful search and sort options and unparalleled user friendliness among disc databases.

Pulldown menus in all program and fully mouse integrated.

Icon driven for speed, efficiency and ease of use.

Special features are Random access disc files, user friendly edit and display with comprehensive and easy to follow manual and a 2Mb data capacity.

Available from : Advanced Memory Systems Ltd., of Warrington.

*Graphics by 3D Zicon and, below, the 1,000 field database*

## *From Page 23*

AMX mouse, which can be bought for a further £40.

The new package will also run with any of the 10,000 AMX mice already sold to users of the BBC Micro.

It is the 16k ROM which provides either the tape or disc user with a Mode 1 colour drawing program. But users with a disc based system will find numerous additional facilities can be selected direct from screen.

Colour pictures can be created in pixel resolution up to A4 size by scrolling the screen window. Other functions include use of icons, additional text styles, copy facilities and colour zoom.

Pictures can be printed out in colour or shades of black and grey on Epson-compatible printers.

Asked to explain the differences between the old mouse package and the new one, a company source replied: "It's a bit like Clark Kent turning into Superman really – only this is Super Mouse..."

AMX has also launched a range of icon-driven software for mouse owners to get their teeth into.

The leader of this pack is likely to be the AMX Pagemaker, a high resolution A4 typesetting and artwork system.

Comprising two ROMs, 8k and 16k, it features a fast scrolling page, wide selection of typefaces and fonts and a cut and paste facility.

A full A4 page – or any part of it – can be dumped to printer in high resolution.

With the AMX 3D Zicon, it becomes possible to transform three dimensional vector data and translate them into on-screen graphics.

AMX Database offers a filing program featuring 1,000 records with unlimited fields per record, together with a search and sort facility.

On the educational front, AMX XAM allows the creation of a multiple choice exam which could not be altered by the examinee.

Prices range from £14.95 to £49.95.

"We have designed these to stretch people's minds without stretching their budget", said an AMS spokesman.

# BBC MICRO HELPS SIMPLY RED TO KEEP IN TOUCH

**HARD work and talent have smoothed the path to stardom for Britain's hottest pop group, Simply Red.**

But the success story of the six youngsters from Manchester also owes a lot to thoughtful planning and efficient organisation – stemming from a backroom operation whose cornerstone is a BBC Micro.

While they are busy songwriting and performing, the micro keeps track of their engagements, correspondence, accounts – in fact all the records that don't have a hole in the middle.

This month Simply Red move on to a new level of high tech sophistication when they become the first pop stars to introduce telecomputing into their organisational structure.

When their current national tour with superstars UB40 ends they will embark on their first major solo countrywide series of concerts.

All the time they are on the road they will be in contact with their Manchester headquarters through the medium of MicroLink, Britain's fastest-growing electronic mail service.

The group's road manager will have a portable computer with him for communication via modem and MicroLink to the BBC Micro at Manchester for updates to their schedule, news of contracts and recording offers and instructions from the group's manager, Elliot Rashman and associate manager Andrew Dodd.

When that tour ends early in December Simply Red are off to Belgium, Holland and France. In January they tour the rest of Europe and then head for America.

And the portable micro will go with them everywhere – as much a part of their equipment as the guitars and drums.

The group's management bought their BBC Micro earlier this year on the advice of computer enthusiast Andrew Dodd in time to help with the extra workload resulting from demands for Simply Red's services following their smash hits "Money's Too Tight To Mention" and "Come To My Aid".

"The computer is now an indispensible part of our organisation", Elliot Rashman told *The Micro User*.

"All our accounts, our files, our address index are on the system. We use it as a word processor for correspondence, invoicing and information sheets for the band and the road managers.

"We've been able to load a lot of our work on to the BBC Micro because it is so user friendly that we have quickly been able to take advantage of what it can do for us.

"Now we are very much into telecomputing and our MicroLink membership means that wherever the band is in the world they are only seconds away from getting the latest information from myself and Andrew here at the office".

## Safer transfer

IF transferring taped programs to disc is giving you problems, Vine Micros claims its new Replay system for the BBC Micro gives 100 per cent success with next to no effort.

The system includes a stop and save routine, a facility to print out any screen, and most disc-to-disc transfer.

Arcade adventure games can be loaded from where the user left off, and hard copies can be made of the player's performance.

Vine promises Replay won't turn users into pirates. Because of encoding, the discs produced on one computer are not useable on another, making the system completely personal.

Replay is in ROM with additional hardware.

Price: £35.

# 'Fix it' sparks new language

A "JIM'LL Fix It" television programme five years ago was the inspiration for an information scientist's involvement in designing teaching packages which has culminated in him producing a radical new computer language system for the BBC Micro called MicroCodil.

Dr Chris Reynolds, of Brunel University, Uxbridge, saw Jimmy Saville fix it for a boy who wanted a computer to do his homework for him. That gave the educator and computing expert the idea of writing software to help his own students.

Over the years he has steadily developed his programs and has now come up with MicroCodil, a teaching package which he says "provides the user with a knowledge-based environment which contains all the tools a novice needs to handle null and multiple values, ranges, approximate matching – both numeric and spelling errors – probabilities, and fuzzy matching".

These facilities, he says, are totally missing in most conventional languages, and are often difficult to use in sophisticated research-based artificial intelligence and expert systems packages which only run on very powerful computers.

Dr Reynolds says MicroCodil is an integrated language system for the BBC Micro based on "a very simple yet extremely powerful model of human thought processes.

"This provides a friendly environment which can be used to support classroom applications, to assist in computer appreciation classes, or to demonstrate a wide range of advanced information technology concepts to computer science students", he said.

The package utilises windows to provide the user with alternative views into the system, and colour to provide dramatic syntax checking of the user's typing.

MicroCodil consists of two discs containing almost 200k of programs, knowledge bases and help files. The price is £25 for a double sided 80 track disc.

It is available on a double sided 40 track disc for the same price or on two single sided discs for £30.

## OXFORD PASCAL

PUBLISHER Holt Saunders has brought out a definitive guide to Oxford Pascal for the BBC Micro, recommended by Oxford Computer Systems.

Its author, Ian Sinclair, who has written more than 30 books on computer-related topics, says: "Pascal has been a language waiting for a good implementation and I believe Oxford Pascal is just that".

Price is £7.95.

## 3D graphics

A FULL 3D graphics development system for the BBC Micro that allows the user to create, display, modify and store 3D graphics images has been launched by Glentop Publishers.

The Honeyfold system permits images to be included in the user's own software, either from Basic or machine code.

Available on 40 or 80 track, the system costs £25.

## Comms system

A VIEWDATA communications system for the BBC Micro has been released by Xyllyx.

It includes all necessary software, cables and modem and costs £99.

# Welfare worker wants software

COMMUNITY worker Stasia Sykes wants to find a socially motivated programmer willing to write software for the BBC Micro that will help the unemployed and others to get the benefits to which they are entitled.

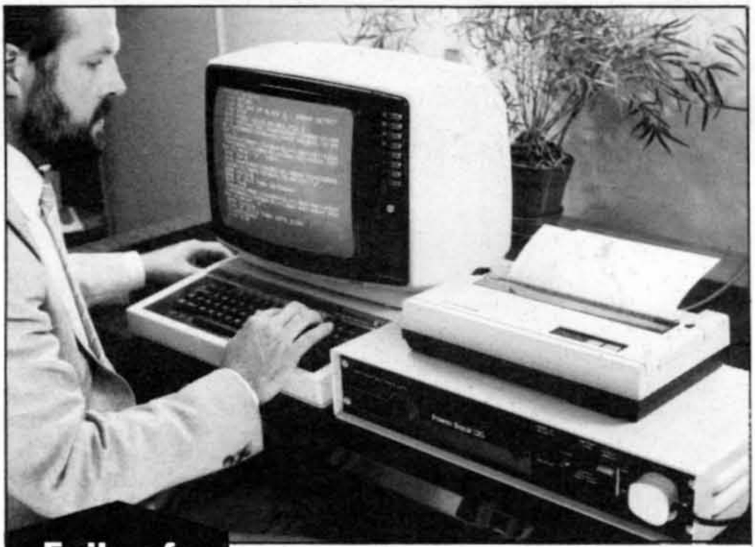
The micro in the activities room at the Probation Service offices in Manchester, where she is a resource person, is currently being used for playing arcade games.

"We want to see the machine used for more serious purposes", she told *The Micro User*. "For instance there is a great need for welfare rights information that can be accessed simply and easily.

"At the moment it is spread throughout dozens of brochures, not all of which are comprehensible to everyone.

"The DHSS and Citizens Advice people have this sort of information on disc, but their programs are either very complicated to use or they don't run on a BBC Micro.

"So if any reader of *The Micro User* can help by taking all the available information and putting in a program for us we'd like to hear from them on 061-226 3515".



## Fail-safe power pack

A NEW uninterruptible power supply from Power Equipment can provide a BBC Micro with emergency power for 20 minutes in the event of mains supply failure, allowing time for data to be safely copied to disc.

The 120 VA Power Bank also smooths out data corrupting power spikes and surges to give a steady frequency and voltage at the output.

Installed between the mains and the micro, it contains a bank of sealed-for-life batteries which are continuously recharged from the mains.

During mains failure a battery condition monitor will operate an audible alarm when the charge is becoming too low for effective operation.

Price £495.

# SHOW THE CHANCELLOR HOW IT'S DONE

COME Budget day armchair economists throughout Britain agree on just one thing – the Chancellor has got it wrong again.

But until now his critics have never been able to test how good a job they could do on balancing the nation's books.

Educational software house Chalksoft is providing BBC Micro users with that chance with one of five new educational titles on disc in its latest catalogue.

Its Yes Chancellor, price £17.50, is a complex simulation game for 11-year-olds upwards. It allows the user to take the Chancellor's place and set the country's level of taxation, borrowing and its budget.

It then works out what would have happened and leaves the user to sort out the results.

A decision to award civil servants huge pay rises may lead to greater borrowing. This in turn means higher interest payments which have to be offset by raising income tax.

Other sectors become angry at this and demand rises also.

The other four BBC titles are Hotline Quiz, Number 5, Statspak and Centre-Ville.

Hotline Quiz challenges children of primary and middle school age to save the world from nuclear war by correctly answering questions on nine subjects. Questions can also be set by the teacher. Price: £14.95.

Number 5 is a five program mathematics suite, priced at £14.95, which includes estimating, reading dials, simple algebra and tables.

Also dealing with numbers is Statspak. It enables those learning or teaching statistics to explore the subject and prepare data and charts for display and analysis. Price: £17.50.

Centre-Ville is a French language program for middle and secondary schools, covering subjects such as directions, colours and numbers. Price: £17.50.

# PLUTO II GRAPHICS INTERFACE

**TO give the BBC Micro user enhanced graphics capability PLB has devised an interface for the Pluto II graphics card manufactured by I/O Research.**

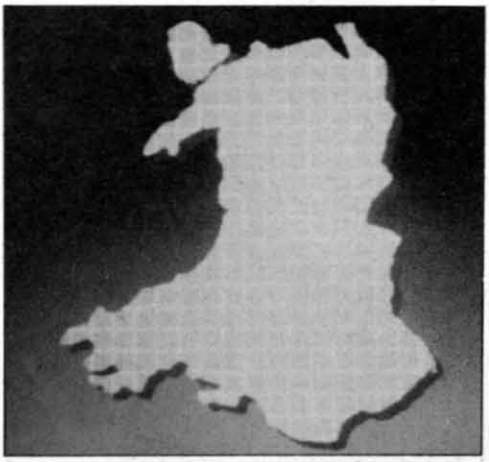
**The result is the Pluto programmers library for the BBC Micro, written in 6502 machine code, which accesses the more than 100 Pluto commands.**

**These allow the programmer to invoke most of the commands referred to in the Pluto/Palette manual as user callable functions and Palette commands.**

**Within the Pluto firmware these range from simple line drawing to copying complete areas of the screen.**

**Also included is a screen saving routine and a graphics tablet routine which are the elementary building blocks from which more complex routines may be constructed.**

**A simple graphics package with many standard routines of line drawing, rubber banding lines, rectangles, colour fills, brushes and others is packaged with the interface and software library at a cost of £250. Pluto II costs £2,925.**



# Electronic mail is attracting teachers

**HEAD teachers, school administrators and local education authorities have become such enthusiastic users of The Times Network for Schools electronic mail service that they are being offered their own separate mailboxes at special rates.**

Secondary school members of TTNS can now take up extra electronic mailboxes at a cost of £34 each for the whole academic year.

The offer is also open to new subscribers signing up before the end of this month. From December mailboxes will cost £34 a term.

For each full-price mailbox, costing £69 a term or £187 a year for unlimited access, TTNS members will be entitled to a second mail-only box primarily intended for communication between head teachers, school administrators and their local education authorities, as well as with other members of the system.

Every local education authority in the UK now has at least one TTNS mailbox, and membership stands at more than 1,000 schools, universities and colleges.

The supplementary mailboxes now being offered are dedicated to high-speed exchange of messages, including lengthy documents.

A TTNS spokesman told *The Micro User:* "The idea of the extra mailboxes is so that schools can have one devoted to administration and software downloading, allowing the main installation to operate exclusively as a teaching resource".

# Doc aims high

AIMING to repeat the success of its chart topping program 747, Doctor Soft stays in the air with Phantom Combat for the BBC Micro.

As well as the usual flight simulator features, the 3D outside view is enhanced by computer drawn and flown delta aircraft outlines permitting formation flying and combat.

Written by a professional pilot and a military flight simulator software engineer, the program has a "simulator inside a simulator" mode where target aircraft are controlled from separate keys.

One or two analog sticks can be used or full key controls. Price: £9.95.

# Putting micro to work

A METHOD of connecting working models to a BBC Micro is provided by three new interfaces from Pilot One.

The controllers plug into the user port of the micro and the software provided allows models to be driven from the keyboard.

Alternatively, a sequence of movements can be programmed.

Buggy Controller has relay outputs to independently control the directions of two motors. In addition a switch circuit is connected for controlling lights, horns or an electro-magnet. Price £37.50.

Crane Controller connects a model crane to the BBC Micro. It has relay outputs to control the directions of three motors at a time and a switch circuit for controlling lights, horns or an electro-magnet. Price £39.50.

Railway Controller has relay outputs to independently control the directions of a model railway engine. Two outputs are available for connecting points, uncoupling rails or other track elements.

The engine circuit is fed from a separate power line so that speed can be controlled using a standard train controller.

Track elements can be supplied with the usual set power supply. The software pulses the power to the points to protect the motor drives. Price: £39.50.

# Assassin gets the chop

A SOFTWARE house's name for one of its BBC Micro text adventures, Assassin, has itself been killed.

Robico released Assassin in February to magazines for review. Later ICI asked for the name to be withdrawn as it already used Assassin as a trademark.

In a generous gesture ICI agreed to contribute towards the cost of changed advertising and packaging.

Unfortunately Robico's customers have not yet become accustomed to the new name.

"We still get them asking for the Assassin", said the company's Robert O'Leary. "They are quite bewildered when they receive Rick Hanson, the program's new name.

"It is difficult to get it to register that the game is the same in all but name".

And just who is Rick Hanson – a famous assassin from the past?

"He's just the character that the adventure is based on. The name was made up by the programmer", says Robico.

# Adventure for Robin Hood

**THE adventures of Robin Hood are now featured in The Touchstones of Rhiannon, latest game from Adventure International for the BBC Micro.**

**Based on the TV series Robin of Sherwood, it uses full sentence commands.**

**The player assumes and controls the character of Robin Hood. Maid Marion and friends assist Robin in his task to retrieve the Touchstones of Rhiannon and return them to Rhiannon's Wheel.**

**Available on cassette price £7.95. Text only.**

# Acorn thinks again on overseas sales targets

**ACORN has been forced to drastically revise its previously buoyant overseas sales forecasts in the light of international market conditions.**

It no longer expects to achieve vast volume sales world wide as happened in the UK.

The company now anticipates that it will sell little more than 30,000 BBC B+ machines abroad during the current year – only a marginal increase on 1984 sales.

"We are not expecting anything as spectacular as what happened in the UK", Owen Maddock, Acorn International's sales manager confided to *The Micro User*. "The fact of the matter is that we have begun to appreciate that the British are a nation apart because of their interest in electronics. We are not expecting home micro sales to achieve anything like the sort of penetration elsewhere in the near future".

However Acorn predicts that its foreign sales will continue to grow annually – but not dramatically.

"We expect to maintain a slow but steady increase over the next few years", says Owen Maddock.

Australia is currently top of the overseas league for Acorn, accounting for between 25 and 30 per cent of all international sales. The company's activities down under are confined almost exclusively to the education field.

Second comes Holland where sales are divided equally between home users and education. South Africa runs a good third, followed by New Zealand, Belgium and Italy.

The BBC Micros have also had some impact on the Indian subcontinent where they are being made under licence by a local company. In all some 4,000 machines have been sold out there.

"Potentially this is a vast market", says Owen Maddock. "But once again we cannot expect to suddenly see huge sales of micros out there".

Acorn has even managed to get a toehold in Russia in the last few weeks with an order for "a few hundred machines".

The deal was handled by 3SL, official distributors for the Eastern block nations. However the company is going out of its way to play down the mini breakthrough.

"Considering we've been in there for two years, it's nothing to shout about", says 3SL spokesman David Springle.

"When sales get to 10,000 we'll be only too pleased to tell everybody".

# Log-on to the Irish Man

A BBC Micro is playing a major role in a computer bulletin board system newly set up in Northern Ireland.

Schoolboy Mark Stringer, of Bangor, County Down, is using his micro, modem, Watford DDFS 1.53 and SBBS system software to operate the board.

Called SBBS II-The Irish Man, it operates seven days a week, from 9pm-11pm on ringback and 11pm to 9am direct connect – telephone Bangor 455162.

Baud rates provided are 1200/75 and 300.

Mark, a pupil of Bangor Grammar School, told *The Micro User* he hoped the board would cater for all home users.

## Groups

"The bulletin board will have special interest groups for the common types of personal computer", he said.

"It will also have sections devoted to technical help for home computer users, music from pop to classic, graffiti, sales and wants, and will provide an electronic mail facility.

"I also intend to introduce some multi-user games similar to those run on Micronet by the Micronet Mailbox Club".

# Econet helps engineers

STUDENTS at Brighton Technical College are using their BBC Micro Econet system in conjunction with a computer numerically controlled machine tool.

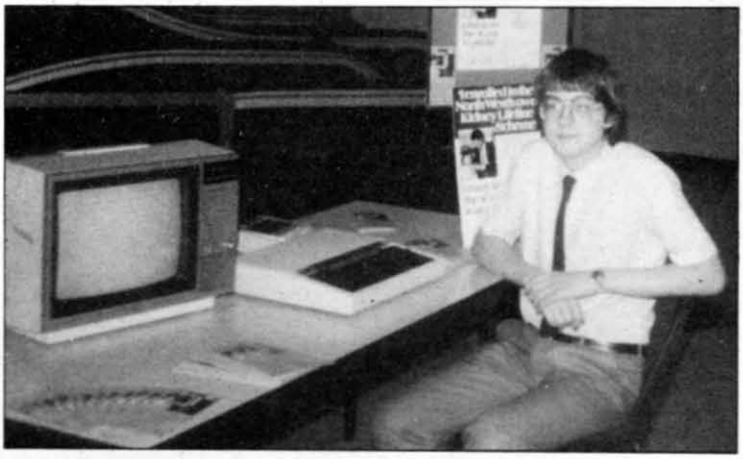
The Colne 5 CNC training lathe has software enabling toolpath emulation colour graphics.

This allows students from the college's mechanical and production engineering department to check a programmed cut before cutting commences.

Using Econet they can use additional software kits to work at separate BBC Micros, sharing access to the lathe.

Standard ISO G-codes are employed, as in full-size machine tools, and the lathe is able to cut mild steel to a high standard.

The complete package for the BBC Micro, from Colne Robotics, includes lathe hardware, manual and software kit, plus a selection of accessories and tools, and costs £2,295.



# BBC database for kidney donors

THE success rate of kidney transplants is impressively high and the chances of patients receiving well matched kidneys is greater as more donors come forward.

*Now with the help of a BBC Micro this success rate is being increased.*

Pioneered in the North West is the world's first Computer Kidney Lifeline, written by Jason Welch, a pupil at Manchester Grammar School.

With the completion and return of a registration form to the Kidney Lifeline Micro at the University of Manchester's Institute of Science and Technology, lives can be saved.

Names and addresses from the forms are keyed into the machine. In the event of the sudden death of an individual the doctor can telephone the computer direct to ascertain whether that particular person had registered.

If the answer is yes the doctor can then approach the next of kin.

Only hospital doctors have access to the computer, ensuring complete confidentiality of the information about donors contained on the database.

Anyone wanting to register as a potential donor should ring the Freephone Kidney Lifeline on 061-236 0678.

# Practicalc II for BBC

THE spreadsheet with word processing and database capabilities, Practicalc II from Practicorp, is now available for the BBC Micro.

It is compatible with the 6502 second processor, most RAM boards and the BBC B+.

Features include 80 column display, when more than 32k of RAM is available, comprehensive context sensitive Help screens, variable column width and offset loading.

Price is £69.95.

## Tecmedia Marketing Services Limited

5 Granby Street Loughborough LE11 3DU

# FREE BROCHURES AND CATALOGUES

Obtain the very latest details of the products featured here — *ABSOLUTELY FREE!* Simply complete the coupon below and send by FREEPOST to Tecmedia Marketing Services

**NO COST ● NO OBLIGATION ● NOTHING COULD BE SIMPLER**

## Micro Viewdata

A complete viewdata system

### VIEWDATA SOFTWARE FOR THE BBC MICRO

*Micro Viewdata* allows you to create viewdata frames, store them on disk and display them — no modem or other equipment is needed. *Micro Viewdata* delivers more power for less money than rival packages, is a faithful offline emulation of MICRONET/Prestel and is easy to use. Powerful frame editing features include: cut-and-paste facility, on-screen windows, insert or delete lines, and an UNDO command. Other features include friendly routes editor, 'jotter' file, carousel facility, printer dump, coloured keystrip and extensive tutorial guide. Send for full details. *Tick box no.* 1

## Edfax

### TELETEXT emulator

*Edfax* is a simulation of teletext for the BBC micro. You can create colourful pages of information, store them on disk, make an index and search by page number. The whole package is easy to use and is an ideal introduction to the world of videotex. Create your own school magazine using the uncomplicated editor, which provides all of the features of Ceefax and Oracle screens including 'cycle' pages. Complete with an 80-frame sample database providing many ideas, coloured keystrip and full user guide written with the novice user in mind. Over 3000 sold to date! *Tick box no.* 2

## LOGOTRON LOGO POWERS THE BBC MICRO

Professor Brian Harvey of the Massachusetts Institute of Technology, author of *Computer Science Logo Style*, wrote recently:

**'The truth is that Logo is by far the most powerful programming language available for home computers.'**

If you want to understand modern programming methods, artificial intelligence, and robotics, then Logo is the language for you. *Logotron Logo* breaks new ground by being fully extensible at machine code level; it resides on a single 16K ROM; and works with RAM extension boards, second processors, and on the BBC B+. *Tick box no.* 3

## LOGOTRON LOGO OFFERS NEW EXTENSIONS

This disk includes *Advanced Logo* and *Control Logo* software, five specialised extentions to *Logotron Logo*, five more reasons why *Logotron Logo* has been chosen by education authorities and Logo enthusiasts around the country.

*Advanced Logo* provides primitive procedures to manipulate property lists, change of the size of the edit buffer, directly manipulate the registers of the 6502 processor, and access the internal clock of the BBC micro.

*Control Logo* allows direct control of the BBC micro's external ports. Developed at the Walsall Logo Project, *Control Logo* can be used to drive the BBC Buggy, Fischertechnik models, Milton Bradley Robotix kits, and Lego motors. *Tick box no.* 4

## SPRITE ◂LOGO▸

◂LOGO▸

**SPRITE LOGO MEANS HIGH-SPEED ANIMATION**

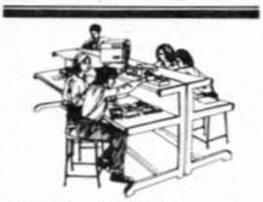
*Sprite Logo* uses an advanced Texas Instruments video control chip, which generates up 32 coloured sprites on the screen at any one time.

**SETSPEED, SETHEADING, SETCOLOUR, SETSIZE, SETSHAPE, SETPENCOLOUR, SETWALK, FREEZE, THAW**

These are just a few of the commands you can use to control the movement of the sprites on the screen. *Sprite Logo* offers supercharged turtle graphics, which hold the attention of children and adults alike. Like Logo, *Sprite Logo* was devised in the artificial intelligence laboratory at the Massachusetts Institute of Technology. You only have to see it to want it. Send for a free brochure. *Tick box no.* 5

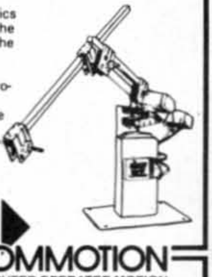
**LOGOTRON**

## TECHNOLOGY BENCH



How many times have you seen the latest micro computer equipment sitting on a tired looking school desk or the old dining room table? What about the monitor balancing on top of the computer, or the mains cables and multiplugs which you try to avoid tripping over? These are common problems because there isn't a proper home for your equipment. Now there is a professional alternative. The *Whitefield Technology Bench* was designed by technology teachers to hold two people, their equipment and still have room for experimentation. What's more it was designed to sell at under £200 — and it does! Want to know more? *Tick box no.* 6

## Complete robot system



A robot arm, plotter, sorting system and graphics board are all projects which can be built with the *Fischertechnik Robot Kit*. The kit contains all the parts to build 10 projects and with a little imagination others can be made. Once built, each model can be controlled from a BBC microcomputer using the Unilab interface supplied. The interface comes with software to run some of the projects and can also be used to power and control other robotic devices. So for an inexpensive introduction into the world of control, try the *Fischertechnik Robot Kit* complete with Unilab interface at £110 (excl. VAT). *Tick box no.* 7

**COMMOTION**
COMPUTER OPERATED MOTION

## Low-cost vision system

micro robotics EV1

At a cost of £130 (excl. VAT), the *Snap EV1* vision system is an effective way of capturing pictures and displaying them through a microcomputer. This compact little camera plugs directly into a BBC or Commodore computer user-port and, with the software supplied, allows picture storage, animation, grey scaling, motion detection, picture composition and object recognition. The camera uses an interchangeable Pentax lens. Comprehensive instructions together with disk and tape software complete the package. Interested? Why not ask for more details. *Tick box no.* 8

To **Tecmedia Marketing Services Limited**
**FREEPOST** LOUGHBOROUGH Leicestershire LE11 0BR
**NO STAMP REQUIRED**

Please send me full manufacturer's/publisher's details of the following products:

*Please tick appropriate boxes*

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|
| ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |

NAME
(BLOCK CAPITALS PLEASE)
ADDRESS

POST CODE

*Type of user (please tick)*
☐ HOME
☐ BUSINESS
**EDUCATION**
☐ PRIMARY ☐ SECONDARY ☐ FURTHER/HIGHER

MU11.85

# Flying start for educational software group

THE new organisation aimed at making educational software more readily available to BBC Micro users has got off to a flying start.

British Educational Software Associates has already signed up 150 "serious stockists" – computer dealers who will stock BESA's core list of 40 programs and will be able to meet orders for another 200 plus titles within 48 hours.

The group's target of 200 retail outlets is likely to be met by the end of the year, according to Craig Thatcher of distributor Proteus, the man in charge of BESA's dealer recruitment.

In common with *The Micro User's* ongoing campaign to get more educational software on to retailers' shelves, BESA intends to encourage dealers to stock more of this type of program and aggressively promote public awareness of its availability.

Founder members of the group are Applied Systems Knowledge, Bourne Educational Software, Calpac Computer Software, Collins Software, Griffin Software Hill MacGibbon, Macmillan Software and Widgit Software.

"More publishers will be joining us in the new year", says Thatcher.

"There has been an overwhelming response to BESA throughout the industry and we have had contact already with many other BBC Micro educational software producers who want to contribute to our range.

"In particular we shall be focussing on programs that combine education with entertainment. We want to get away from what I call the 'chalk dust stuff' – educational programs so dull and boring they turn youngsters off.

"If we can get the right sort of quality product I believe educational software for the BBC Micro will really take off in the next few months".

Opus
CHALLENGER 3

# Speedy drive system

A NEW disc drive system for the BBC Micro and B+, the Challenger 3, is twenty times faster than conventional models, claims manufacturer Opus.

This it says is made possible by a combination of a 5.25in double sided 40-80 track switchable disc drive, a double density disc interface and solid state RAM disc.

It provides 256k of dynamic RAM, upgradable to 512k, and is accessed as a second processor.

The disc drive – which may be used in single or double density – has a track to track access time of 3msec and a setting time of 15msec.

The interface uses a 1770 disc controller as featured in the B+. This is capable of supporting up to three disc drives which may be single, double sided, 40 or 80 track, and double or single density. The interface automatically detects which type is being used.

The unit is connected to the BBC's expansion bus by a 34-way ribbon cable and by a power cable to the computer's auxilliary power connector. No tracks need to be cut or jump wires installed.

Software is supplied by a 27128 ROM installed in one of the sideway ROM sockets.

The system costs £250 and a separate RAM disc upgrade to 512kb £50.

# A level maths course

COMPUTER assisted learning specialist LCL has produced a third title in its maths series for the BBC Micro and BBC B+.

Called Mega Maths, it is a complete 24-program, self tuition and revision maths course for A level and other mature students.

LCL's earlier titles were Animated Arithmetic, for the very young, and Micro Maths for O level students.

Its latest package includes 105 topics, covered by all A level examination boards, relevant to both pure maths and pure and applied maths.

These include permutations and combinations, remainder theorem, inequalities, logs and partial fractions.

The software was written by a professional graduate programmer in consultation with a fully qualified advisory panel, and was extensively tested in schools, says LCL.

Available on disc or tape, Mega Maths costs £24 and comes with a user manual and a book of model questions and answers taken from actual university papers.

# FIFTY COLLECT A HOBBIT

FIFTY Micro User readers who entered the free contest in the July issue are the lucky winners of the new disc-based version of the Hobbit, one of the all-time classic micro games.

Based on the plot of Tolkien's famous book of the same name, the game involves stealing treasure from the evil dragon Smaug with the player in the role of Bilbo Baggins, the gentleman hobbit.

Each character makes his own decisions so that the game is slightly different every time it is played. This adventure has only recently become available on disc for the BBC Micro from Melbourne House.

Contest winners are:

I. Roddick, 8 Nithsdale Place, Dumfries, L.A. Modge, 33 Southwark Road, Strood, Kent, P.H. Scott, 125 Ramsey Drive, Arnold, Nottingham, D.L. Wright, 9 Rana Court, Braintree, Essex, P. Wise, 3 Spindleberry Close, Welwyn, Herts, R. Barnes, 1 The Paddock, Harston, Cambs, J. Bowen, 37 Cavendish Close, Waterlooville, Portsmouth, K. MacKay, 1 First Avenue, Bearsden, Glasgow, C.F. Neighbour, 139 Victoria Road, Barking, Essex, R.W. Hallows, 20 Trefusis Road, Falmouth, Cornwall,.

M. Allerston, 16 Norland Avenue, Anlaby High Road, Hull, J. Walker, 2 Barrett Clough Head, Slaithwaite, Huddersfield, W. Yorks, A. Tattersdill, 9 Forrest Avenue, Essington, Wolverhampton, M.P. Carroll, 2 Mainsforth Drive, Billingham, Cleveland, G. Neal, 35 Eton Road, Ellesmere Port, South Wirral, B. Thorpe, 90 Brown Lane, Heald Green, Stockport, Cheshire, D. Yates, 10 Lon Nant, Myddleton Park, Denbigh, Clwyd, I. Stephenson, 65 Globe Farm Lane, Darby Green, Blackwater, Camberley, Surrey.

P. Noble, 74 Church Street, Old Glossop, Derbyshire, C.J. French, 11 Stanford Close, Frampton Cotterell, Avon, J. Clouting, 18 Weston Road, London, A. Warm, 41 Randale Drive, Unsworth, Bury, Lancs, T. Stubbs, 18 March Drive, Bury, Lancs, I.J.R.C. Nutt, 46 Preston Road, Lytham St Annes, Lancs, M. Atkins, 5 Baylis Walk, Terry Road, Broadfields, Crawley, W. Sussex, J. Hathaway, 20 Willis Lane, Whiston, Prescot, Merseyside.

P. McKnight, 4 Eavesdale, Skelmersdale, Lancs, M. Fernyhough, 'The Arles', Hadley, Droitwich, Worcester, P.M. Grady, 115 Noak Hill Road, Billericay, Essex, A.T. Leach, 38 Wolsey Way, Chessington, Surrey, M. Heyworth, 175 Dirkhill Road, Bradford, W. Yorks, C. Worrell, 34 Whitehall Road, Thornton Heath, Surrey, W.R. Bayston, 5 Dale Court, Crowther Way, Dale Road, Swanland, North Ferriby, North Humberside.

W.L. Tough, 31 Longformacus Road, Edinburgh, D.G. McLeod, Flat 1, 74 Lauriston Road, South Hackney, London, R.W. Woodhead, 13 Springfield Road, Redhill, Nottingham, J.W. Brown, 63 Arnesby Avenue, Sale, Cheshire, P.J. Prescott, 2 Arundel Villas, Lynchborough Road, Passfield, Liphook, Hants, S.P. King, 2 The Homestead, Redenhall Road, Smallfield, Surrey, G. Peach, 13a Lewn Street, Middlewich, Cheshire.

S.G. Pritchard, 55 Middlewich Road, Holmes Chapel, Crewe, M. Norris, 91 Bridle Road, Shirley, Croydon, Surrey, R. Pickering, De Bohun Junior School, Green Road, Southgate, London, S. White, 114 Linby Road, Hucknall, Notts, J.A. Stubbs, 41 Kingston Road, Ashchurch Gardens, Tewksbury, Gloucestershire.

S.H. Buxton, 52 Robey Drive, Eastwood, Notts, S. Crowther, 42 Half Mile Lane, Leeds, C. Hopkins, 106 Colchester Avenue, Penylan, Cardiff, B.W. Knight, 15a West Gardens, Tooting, London, P. Proudman, 23 Keats Gardens, Park View, Kidsgrove, Stoke on Trent, Staffs.

# Organised thoughts

AN IDEAS processor program called Scratchpad has been developed for the BBC Micro by Innovative Software.

A cross between a word processor and a spreadsheet, it is designed to help writers marshal their thoughts. Ideas can be rearranged to form a skeleton text and added to later.

Like a spreadsheet the writer can try out different structures for the text using simple commands. The final structure can be printed out as hard copy and spooled to a word processor file.

Scratchpad is disc-based, tube-compatible and comes with a manual. The price is £24.95.

# Computing beats stardom for Raj

A CHILD actor whose first big break came when he was chosen to play the prince in "Indiana Jones and the Temple of Doom" sought only one reward from the role – a BBC Micro.

Raj Singh, the 14-year-old son of a retired Indian diplomat living in London, opted for his own computer before the remainder of his payment for the part was put away for him.

"I suppose I could have chosen almost anything", he told *The Micro User*, "but I love computers even more than acting.

"So I ended up with my very own Beeb plus a few extras".

Raj was studying one day a week at the Sylvia Young Theatre School when he was called in for an audition for the Indiana Jones film.

Such was the impression he created that a video was made of him and rushed off to director Steven Spielberg. He loved it and Raj had made his breakthrough.

The next three months saw him at Elstree Studios dividing his time between being on set and receiving private tuition courtesy of the filmmakers.

"Steven Spielberg was wonderful to work with", Raj recalls. "He was just like another kid – not an adult.

"It was an experience I wouldn't have missed for worlds".

However fame didn't go to Raj's head. After all, he is certainly not the only celebrity in his family. Apart from his diplomat father, his grandfather was a renowned doctor back in India, while his mother was interviewed by Terry Wogan on television after becoming Britain's first Sikh Justice of the Peace.

The schoolboy actor is currently studying for his O levels at Ealing College, where he will not be caught day dreaming of a Hollywood career.

"My future lies in computers", he said. "And I'm just hoping my Beeb holds the key to it all".

***Raj Singh . . . opts for the BBC Micro***

# Arabs go for gold

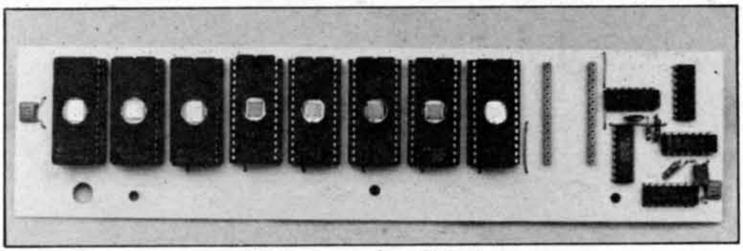
THE latest status symbol for the oil-rich Arab who has everything is a gold-plated computer system based on the BBC Micro.

The original gold micro was specially manufactured as first prize in a competition to celebrate *The Micro User's* second birthday earlier this year.

The system was designed and built by Oak Universal, the Bradford firm which makes the specialised Oak Computer based on the BBC motherboard.

Many enquiries came from the Middle East, where possession of such novelties can give one sheik the edge over his neighbour.

As a result Oak Universal has recently been sending regular shipments of gold micros to Saudi Arabia and the Gulf States.



***ROM extension from JP Designs***

# Control systems applications

THREE new products from J.P. Designs are designed to make it easier to develop independent control systems using the BBC Micro.

Beeb-Ram is a sideways RAM/eprom emulator which allows other external microprocessor systems to share the RAM while providing features usually found on sideways RAM units.

The 16k static RAM is located between &8000-BFFF in the system memory map and can be written to directly. This allows machine code programs to be placed in the RAM by the assembler and can be used to develop software for small controller cards.

A slide switch on the top of the unit determines which of the systems has access. It is connected to the micro via three connectors which require no soldering. Price: £99.95.

The BBC ROM Extension allows an extra 8 × 28 pin eproms to be used in the sideways ROM area of the micro. No soldering is required to install the unit and all the remaining ROM sockets can still be used when it is in place. Price: £24.95.

The BBC Micro can be used as a development system with a series of cross assemblers from Crossware Products, also available from JP.

Producing target processor machine code from target source code, they are designed for use in schools and universities as an educational aid and feature standard mnemonics.

It is possible to assemble 64k of object code, disc to disc in 11 minutes and disc to RAM in seven minutes, while still performing error checking.

The target microprocessors catered for are 6800/1/2/3, 6301/3/3x, 6805/6305, Z80, 8085, 808A, 6809, 68000/8.

Price of the 68000/8 Cross Assembler is £56. The rest are £48 each.

# View database package

A NEW general purpose database program with a range of utilities has been released for the BBC Micro.

Called Viewstore, the 16k ROM package from Acornsoft enables records and fields of variable size to be held. They are only limited by the memory available and type of filing system used.

Users can access one file at a time, make extensive data entry checks and display information in a spreadsheet type format or in a user-defined layout.

The package includes a utilities disc which enables procedures such as allowing comprehensive reports or labels to be made and subsets of records to be used in reports.

Also in the package is a user guide, reference card and function key card. Price: £59.80.

With an Epson RX100+ this would never have hap

Up to 233 characters per line; NLQ (optional); 100 cps;
sheet feeder (optional); Parallel (standard); Serial and IEEE (optional).

**RX100+. Fast. Very good print. Very, very, very wide. £399 (+VAT).**

**EPSON**

# BRING Twillstar

## COMPUTERS

| | |
|---|---|
| NEW BBC Mod B Plus | £449.00 |
| BBC Mod B | £329.00 |
| BBC Mod B & Disc Interface | £389.00 |
| BBC Mod B & Econet Interface | £380.00 |
| BBC Mod B & DFS & ECO | £450.00 |
| **HARDWARE** | |
| Z80 Second Processor | £379.00 |
| 6502 Second Processor | £179.00 |
| Acorn Bitstick | £379.00 |
| Acorn 1EEE | £325.00 |
| BBC Prestel Receiver | £132.00 |
| BBC Teletext Receiver | £225.00 |
| Acorn Music 500 | £199.00 |
| **ACORN WINCHESTER DRIVES** | |
| 10 Mbyte | £1450.00 |
| 30 Mbyte | £2250.00 |
| **TORCH PRODUCTS** | |
| Torch Z80 Card & Perfect Software Packages + Z80 Basic | £315.00 |
| Torch Z80 Disc Pack with Perfect Software + Z80 Basic | £635.00 |
| Graduate G 80012 | £1033.00 |

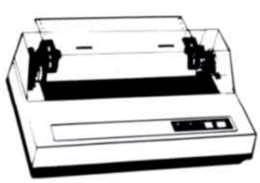
## DISC DRIVES

**SPECIAL OFFER!**

| | |
|---|---|
| New Slimline Mitsubishi Model 4853 | |
| 400K Single 40/80 Track | **£125.00** |
| 800K Dual 40/80 Track | **£250.00** |
| New Slimline Shugart Model 465 | |
| 400K Single 40/80 Track | **£105.00** |
| 800K Dual 40/80 Track | **£210.00** |
| **CUMANA DRIVES** | |
| **SINGLE DRIVES EXCLUDING PSU** | |
| CSX 100 (100K) 1x40 Track Single Sided | £109.00 |
| CSX 200D (200K) 1x40 Track Double Sided | £129.00 |
| CSX 400 (400K) 1x80 Track Double Sided | £149.00 |
| **DUAL DRIVES EXCLUDING PSU** | |
| CDXL 200 (200K) 2x40 Track Single Sided | £189.00 |
| CDS 400D (400K) 2x40 Track Double Sided | £249.00 |
| CDX 800S (800K) 2x80 Track Double Sided | £289.00 |
| **SINGLE DRIVES INCLUDING PSU** | |
| CS100 (100K) 1x40 Track Single Sided | £129.00 |
| CS200 (200K) 1x40 Track Double Sided | £159.00 |
| CS400 (400K) 1x80 Track Double Sided | £179.00 |
| **DUAL DRIVES INCLUDING PSU** | |
| CD200 (200K) 2x40 Track Single Sided | £249.00 |
| CD400 (400K) 2x40 Track Double Sided | £299.00 |
| CD800S (800K) 2x80 Track Double Sided | £329.00 |

**THE BEST NAME IN MEMORY – SPECIAL PRICES**

**CENTRONICS GLP PRINTER**



**SPECIAL OFFER of the month £159.00**

## PRINTERS

**DOT MATRIX PRINTERS**

NEW **The New Epson Printer with NLQ, 100 CPS, 10" wide friction feed**
Optional tractor feed available.

| | |
|---|---|
| **EPSON LX80** | £229.00 |

**The New Seikosha Printer with NLQ, 100 CPS special introductory offer**

| | |
|---|---|
| **Seikosha SP 1000A** | **£229.00** |

Just arrived, Seikosha GP50

| | |
|---|---|
| Graphic Printer | **Only £69.00** |

Parallel and Spectrum version.

| | |
|---|---|
| Kaga KP810 (NLQ) | **£269.00** |
| Kaga KP910 (NLQ) | **£379.00** |
| Canon PW 1080A (NLQ) | **£269.00** |
| Canon PW1 156A | **£379.00** |
| Star SG10 | **£249.00** |
| Star SG15 | **£389.00** |
| Epson FX80 | **£365.00** |
| Epson FX100 F/T | **£495.00** |
| Brother EP44 | **£228.00** |
| Brother M1009 | **£195.00** |
| Shinwa CP80A | **£189.00** |
| MP 165 | **£240.00** |

**DAISYWHEEL PRINTERS**

| | |
|---|---|
| Brother HR15 | £378.00 |
| Quendata DWP 1120 | £229.00 |
| Juki 6100 | £340.00 |
| Juki 2200 | £275.00 |
| Juki 6300 | £799.00 |

**COLOUR PRINTERS**

| | |
|---|---|
| Okimate 20 | £287.00 |
| Canon PJ1080A | £440.00 |
| Seikosha GP700A | £399.00 |
| Epson JX80 | £570.00 |

**PLOTTERS**

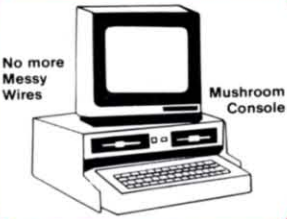
| | |
|---|---|
| Penman Plotter (complete with utilities & cables) | £275.00 |
| Pixy Plotter MT | £399.00 |
| Epson Hi-80 | £445.00 |

## BBC UPGRADES

| | |
|---|---|
| A-B Upgrade | £110.00 |
| Acorn DFS Interface | £89.00 |
| Econet Interface | £69.00 |
| Speech Interface (Special Offer) | £25.00 |
| 1.20/S | £11.50 |
| Acorn Basic II | £25.50 |
| DNFS ROM | £20.00 |

## MONITORS

| | |
|---|---|
| **MONOCHROME MONITORS** | |
| Phillips V7001 Green (while stocks last) | £65.00 |
| Phillips BM7502 Green Screen | £79.00 |
| Phillips BM7522 Amber Screen | £95.00 |
| Kaga KX1201G Hi-Res Green | £103.00 |
| Kaga KX1203A Ultra Hi-Res Amber | £120.00 |
| NEW **Ferguson MM02 P31 Green** | **£97.00** |
| Ferguson MM06 Amber | £97.00 |
| Ferguson MM02 P31 Green | £108.00 |
| Ferguson MM08 Black/White | £108.00 |
| **COLOUR MONITORS** | |
| Microvitec 1431 Std Res | £212.00 |
| Microvitec 1451 Med Res | £275.00 |
| Microvitec 1441 High Res | £420.00 |
| Microvitec 2030 CS20 Std Res | £435.00 |
| Microvitec 1431AP Std Res | £228.75 |
| Microvitec 1451 AP Med Res | £320.00 |
| Kaga RGB Vision II12" High Res | £258.00 |
| Kaga RGB Vision III 12" Ultra High Res | £365.00 |
| **TV MONITORS** | |
| NEW Ferguson RX MC01 | £228.00 |
| Phillips CT2007 | £219.00 |
| Nordmende (Remote Control) | £229.00 |



## TCL SPECIAL WORKSTATIONS

Once again TCL has answered a special need of all BBC Computer users with the new mushroom workstation – no more untidy wiring or pulled plugs. Transforms your system into a handsome console unit.

*Features include:*

- ★ **Advanced Cable Management Twin 400K Mitsubishi Slimline Drives switchable from 40 to 80 Track with Status Indicator LED's**
- ★ **On board regulated 4 Amp power supply with overload protection**
- ★ **Mains Input Filter for clean power supply.**
- ★ **Filtered power to the 3 Take-off sockets at rear for Micro, Monitor and Printer.**

**MUSHROOM WORKSTATION**
At a Special Price of **£349.00** inc. VAT

Those people already owning disc drives can have them fitted into the Workstation. Prices on request.

## EXPANSION BOARDS

**RAMAMP RA20+44**
The RA20+44 board has 20K of RAM addressed from &3000 to &7FFF when switched on with *VIDEO. This will in effect give you back 20K of RAM if you are using say MODE 0. There is also 2 slots of sideways RAM from &8000 to &BFFF which can be used for ROM based software. There is a further 12K of RAM from &8000 to &AFFF which can not be used as sideways RAM. This is the situation in the BBC+ and it means in effect that this board will turn your BBC into a BBC+ as far as the VIDEO and the extra 12K RAM is concerned. One can read and write to this 12K RAM in the same way as the BBC+ does. We offer this RAM as a printer buffer.

| | |
|---|---|
| RA20+44 | **£79.00** |
| Write protect kit | **£5.00** |

**RAMAMP RA32N**
The RAM/ROM board has 6 slots of ROM and 2*16K of sideways RAM that is addressed from &8000 to &BFFF. THIS EXTRA RAM IS NOT AN EXTENSION OF MEMORY FOR BASIC.

| | |
|---|---|
| RA32N | **£59.00** |
| WPK/N | **£5.00** |

**RAMAMP RAM16**
The 16K RAM BOARD (RAM16) is a sideways RAM board which plugs into any spare ROM slot. It is addressed from &8000 to &BFFF. THIS EXTRA RAM IS NOT AN EXTENSION OF MEMORY FOR BASIC. A write protect switch can be fitted. Any utility can be *LOADed into the RAM directly from Disc with the command *LOAD "FILENAM" 8000 RETURN. This can be done wherever the board is fitted, the slot need not be specified.

| | |
|---|---|
| RAM16 | **£32.00** |
| WPK/RAM16 | **£2.50** |

**RAMAMP ROM6S**
The ROM board has 6 slots of ROM (ROM6). Each slot can accommodate any 8K or 16K ROM. One can NOT fit RAM at a later date.
The board is fully buffered.
The board is compatible with all D.D.D. Controllers, RAVEN 20 and indeed our own RA20+44. It is compatible with the SOLIDISC 16/32K or 64K sideways ram board.

| | |
|---|---|
| ROM6S | **£32.00** |

**RAMAMP RA32+**
The RAM/ROM board has 4 slots of ROM and 2*16K of sideways RAM that is addressed from &8000 to &BFFF. THIS EXTRA RAM IS NOT AN EXTENSION OF MEMORY FOR BASIC.

| | |
|---|---|
| RA32+ | **£58.00** |
| WPS+ | **£5.00** |

**The RAMAMP boards come complete with RAM inclusive in the price and are fully buffered. Fitting takes only a few minutes. No soldering required. No bits of the I/O port are used. All bits of the I/O port are yours. Free software is available. Write protect switch can be fitted if required.**

**RAVEN 20**
The RAVEN 20 is a 20K RAM Expansion board for the BBC Micro Model B fitted with O.S. 1.2.
The RAVEN Board provides the user with an extra 20K of usable RAM in screen modes 0-3. This together with the aid of software makes the system completely transparent to both the user and the computer. **£49.00**

# INTO YOUR HOME

## ACCESSORIES

**COMPUTER**

| | |
|---|---|
| BBC Dust Cover Vinyl | £3.50 |
| BBC Dust Cover Plastic | £6.95 |
| Quickshot II Joystick + I/F | £19.90 |
| BBC Data Recorder | £35.00 |
| Waltham MC3810 Data Recorder | £33.95 |

**DISC STORAGE**

| | |
|---|---|
| 10 x 5¼ Library Case | £2.00 |
| 15 x 5¼ Flip-N-File | £5.95 |
| 40 x 5¼ Lockable | £12.50 |
| 80 x 5¼ Lockable | £14.00 |

**PRINTER ACCESSORIES**
**TRACTOR ADAPTORS**

| | |
|---|---|
| FX80 | £33.00 |
| LX80 | £23.00 |
| Juki 6300 | £129.00 |
| Juki 6100 | £129.00 |
| Quendata DWP 1120 | £114.00 |
| Brother HR15 | £95.00 |

**SHEET FEEDERS**

| | |
|---|---|
| Juki 6300 | £183.00 |
| Juki 6100 | £183.00 |
| Quendata DWP 1120 | £165.00 |
| Brother HR15 | £212.00 |
| Printer Leads from | £8.00 |

**RIBBONS**

| | |
|---|---|
| MX100/FX100 | £11.50 |
| MX/FX80 | £5.50 |
| GP80 | £5.00 |
| GP100 | £5.70 |
| GP250 | £6.00 |
| KAGA KP870 | £8.50 |
| Canon PW1080 | £8.50 |
| Brother HR15 M/S | £5.50 |
| Brother HR15 Carbon | £4.30 |
| Juki 6100 | £4.20 |
| Oki 80/82 | £2.35 |
| Riteman | £6.50 |

**SERIAL INTERFACES**

| | |
|---|---|
| Epson 8143 | £34.00 |
| Juki | £58.00 |
| Canon | £91.00 |
| Kaga | £85.00 |
| Epson 8148 + 2K Buffer | £65.00 |

**LISTING PAPER**

| | |
|---|---|
| 11" x 9½ 2000 | £14.00 |
| Epson 81118 | £65.00 |
| Teleprinter Roll | £4 .50 |
| Teleprinter Roll Holder | £14.00 |

**PRINTER LABELS**

| | |
|---|---|
| 1000 90x36mm 1 across | £5.70 |
| 1000 90x36mm 2 across | £6.70 |
| 1000 90x36mm 3 across | £7.70 |

**MONITOR ACCESSORIES**

| | |
|---|---|
| Anti Glare Safety Screen | £17.50 |
| Dust Covers from | £4.50 |
| Monitor Stands Wooden plynth | £11.50 |
| Monitor Stands Tilt and Swivel | £14.00 |

**BBC BOOKS**

| | |
|---|---|
| The Advanced User Guide | £12.95 |
| The Advanced BASIC ROM User Guide | £7.95 |
| The BBC Micro ROM Book | £9.95 |
| Guide To The BBC ROM | £9.95 |
| Basic ROM User Guide | £9.95 |
| Disk Drive Projects for Micros | £5.95 |
| The Advanced Disk User Guide For The BBC Micro | £14.95 |
| Get More From Your Epson Printer | £7.95 |
| The Hackers Handbook | £4.95 |
| The Epson FX/KACA Printer Commands Revealed | £5.95 |

**EPROMS**

| | |
|---|---|
| 2764 | £2.75 |
| 27128 | £4.95 |

**DISC**

**Double Sided Double Density 96 T.P.1. Use at 3m media. Guaranteed for life. Free Library Box included** **£20.00**

## SERVICES

| | |
|---|---|
| Fast Repair Service for the BBC Computer average charge from | £23.00 |
| Printer Repairs from | £20.00 |
| Disc Drive repairs from | £15.00 |

**BBC COMPUTER SPARE PARTS AND COMPONENTS**

| | |
|---|---|
| PSU | £59.00 |
| Keyswitch | £2.00 |
| Complete Keyboard | £59.00 |
| Keyboard Connector | £5.18 |
| UHF Modulatqr | £5.18 |
| Video ULA | £20.00 |
| Serial ULA | £16.00 |
| 6522 VIA | £4.10 |
| 6502A 2 MHZ CPU | £7.50 |
| UPD7002 | £17.25 |
| 6845SP Crt Con | £7.50 |
| SAA5050 Teletext | £10.35 |
| LM324 | £0.50 |
| 6522A 2 MHZ VIA | £6.33 |
| 8271 | £52.00 |
| 74LS123 | £0.46 |
| 74LS00 | £0.28 |
| 74LS04 | £0.28 |
| 74LS10 | £0.28 |
| 7438 | £0.46 |
| 74LS163 | £0.86 |
| 74LS244 | £0.92 |
| 74LS245 | £1.27 |
| 74LS375 | £1.04 |

## DISC UTILITIES

| | |
|---|---|
| View Index | £14.95 |
| View Printer Driver Generator | £11.50 |
| Hi-View | £59.00 |
| Acornsoft Database | £15.00 |
| Clares Betabase 40/80 Track | £23.00 |
| Clares Graph Disc 40/80 Track | £12.95 |
| Clares Replica II Disc Copier 40/80 Track | £11.95 |
| Clares The Key 40/80 Track | £12.95 |
| Microtext Disc | £59.85 |
| Beebugsoft Design | £19.00 |
| Beebugsoft Masterfile II | £19.00 |
| Beebugsoft Teletext Disc | £12.00 |
| Beebugsoft Sprites Disc | £12.00 |
| Beebugsoft Discmaster | £19.00 |
| Beebug Billboard Disc | £19.00 |
| Beebug Quickcalc Disc | £15.00 |
| Beebug "Hershey" Font Disc | £15.00 |
| Beebug Paintbox II Disc | £12.00 |
| Gemini DDD Base | £28.00 |
| Gemini DDD Calc | £28.00 |
| Gemini DDD Plot | £28.00 |

## BBC FIRMWARE

**FIRMWARE**

| | |
|---|---|
| Acorn View Word Processor | £55.00 |
| Acorn View Sheet | £55.00 |
| Acorn Logo ROM | £69.00 |
| Acorn ISO Pascal | £69.00 |
| Acorn BCPL | £99.00 |
| Comconcept: | |
| Wordwise Word Processor | £36.00 |
| Wordwise Plus | £47.00 |
| Intersheet | £49.00 |
| Disc Doctor | £28.00 |
| Printmaster (Epson) | £28.00 |
| Printmaster (Star) | £28.00 |
| Caretaker | £28.00 |
| Graphics ROM | £28.00 |
| Communicator | £60.00 |
| Accelerator | £55.00 |
| Gremlin Debug ROM | £28.00 |
| Interchart | £34.00 |
| Beebug: | |
| Toolkit ROM | £27.00 |
| Sleuth ROM | £29.00 |
| Help ROM | £25.00 |
| Exmom II | £29.00 |
| Spellcheck II | £31.00 |
| Spellcheck Worldwise | £31.00 |
| Spellcheck View | £31.00 |
| Altra: | |
| Enigma Disc Imager | £49.00 |
| Tube Editor | £49.00 |
| Probe I | £39.00 |
| Basic Editor 2 | £35.00 |
| Basic Editor I | £25.00 |
| First Aid II | £19.00 |
| Gemini: | |
| Datagem Database | £115.00 |
| Pace | |
| Toolstar | £33.00 |
| Commstar | £33.00 |
| System ADE ROM | £60.00 |
| System Spy ROM | £30.00 |
| Edward User Pack | £44.00 |
| Edward Teacher Pack | £25.00 |
| BBC Ultracalc | £69.00 |
| BBC Toolbox | £20.00 |
| Clares B ROM | £32.00 |

**ALL PRICES INCLUDE VAT AT 15%**
**'NO HIDDEN EXTRAS'**

**ACCESS/VISA CARD HOLDERS CALL US ON OUR NEW SPECIAL LINE**

**01-571 5938**

**OPEN**
**9AM - 6PM**
**MONDAY TO SATURDAY**

## MODEMS

**NIGHTINGALE MODEM**
**Special Offer £130.00**

Price includes Commstar ROM and comprehensive manual.

| | |
|---|---|
| Auto Dial/Auto Answer Board | £55.00 |
| Auto Dial Utilities Disc | £11.00 |
| OBBS Bulletin Software | £23.00 |

**MINOR MIRACLE WS2000**

BT approved, Optional Computer Control, Auto Dial Auto Answer. Options available.

| | |
|---|---|
| WS 2000 | £148.00 |
| Lead (BBC-modem) | £7.50 |
| Auto answer | £34.00 |
| Auto dial | £34.00 |
| Data beeb | £28.75 |

Communications ROM includes Full Prestel Facility and control of WS 200 Autodial Auto Answer 30 ARDS.

**DEMON**

With its develishly clever features. Auto Dial, Auto Redial Auto Answer Full and Half Duplex European and USA standards complete with Power Supply Leads and Manuals Full Baud Rates

| | |
|---|---|
| DEMON | £57.00 |
| BBC ROM | £24.00 |
| DIAL DISC | £4.95 |

## HOW TO ORDER

You may purchase any of the items listed by cheque made payable to TWILLSTAR COMPUTERS LIMITED.

All you have to do is to list your requirements on a sheet of paper, post it to us quoting ref 2001 and we will despatch your goods within 24 hours. Please add the following amounts for Postage and Packing:

| | |
|---|---|
| Items below £10.00 | add **£1.50** |
| Items Below £50.00 | add **£2.50** |
| Items below £100.00 | add **£3.50** |
| Items over £100.00 | add **£8.00** |

Export Orders welcome. Please ring for details.

**TCL**

**TELEPHONE ORDERS**
**(01) 574 5271**

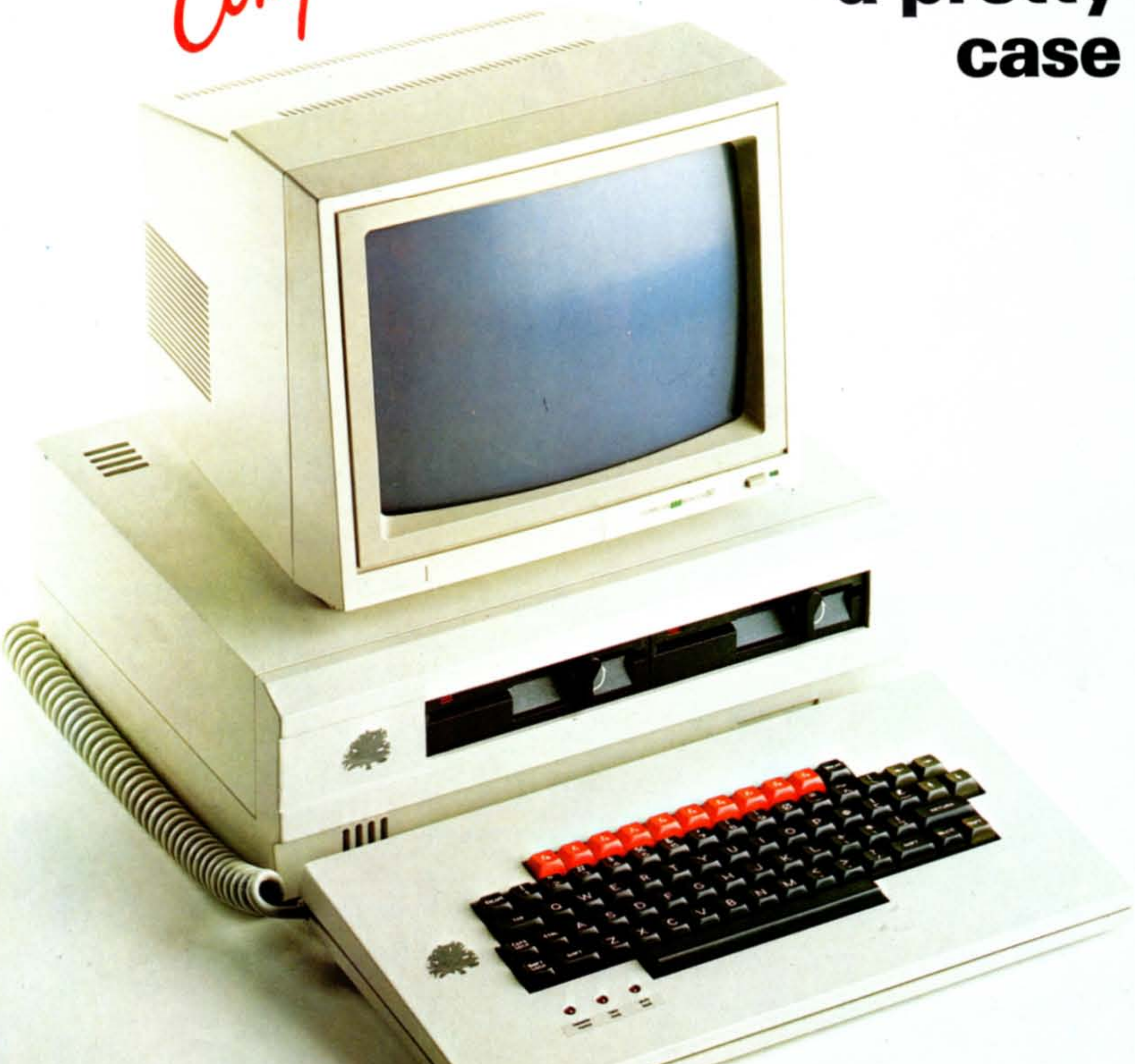
Telex Number 25247 attn TIL

# Twillstar Computers Limited

17 Regina Road, Southall, MIDDLESEX, UB2 5PL

OAK *Personal Computer*

# More than just a pretty case



**Oak Universal Ltd, 20 Crofters Green, Green Lane, Idle, Bradford BD10 8RR**

Please send me more details

Please send me the following ______________________

______________________

I enclose Cheque/P.O. for £ ______________ inc P&P + VAT

Cheques payable to OAK UNIVERSAL LTD

I prefer to pay by ACCESS/VISA (Delete whichever is not applicable).

Card No. ______________________

Credit cards valid if signed by card holder. Address below must be the same as card holder.

Signature ______________________

Name ______________________

Address ______________________

______________________

Please allow 28 days for delivery

Telephone orders by credit card please phone 0274 614167

**Whether you are already the owner of a BBC or you are thinking of buying your first computer — then the OAK PC is for you. The OAK Personal Computer offers a versatile computer unit which can house a wide range of BBC 'Add ons', the beauty being that you can house as little or as much as you require without having to expand your system externally. The OAK Personal Computer is available as casings for existing owners to upgrade, through to ready built systems offering a wide range of specifications.**

OAK

Oak Universal Ltd, 20 Crofters Green, Green Lane, Idle, Bradford BD10 8RR

OAK Personal Computer

The OAK Personal Computer is a member of the OAK family of fully compatible computers with over 1,000 software packages already available. So no matter how specialised your application, you can be sure that there's an OAK Personal Computer and the right software to match your precise needs.

| | |
|---|---|
| **Cases Etc.** | |
| Keyboard case & ribbon data cable | £ 35.00 |
| Keyboard case & coiled data cable & adaptor | £ 49.00 |
| **OAK Personal Computer Model 1** | |
| Keyboard case<br>Processor case<br>Keyboard ribbon data cable | £ 86.95 |
| **OAK Personal Computer Model 2** | |
| Keyboard case<br>Processor case<br>Keyboard coiled data cable | £ 105.95 |
| **Accessories for Models 1 and 2** | |
| 65 watt power supply unit | £ 99.00 |
| Power supply upgrade kit (not required for 65 watt power supply unit; includes cables to motherboard, disc drives, fan, 2nd processor, PSU) | £ 24.00 |
| ROM socket kit | £ 18.00 |
| 2nd processor chassis | £ 8.00 |
| Disc drive blanking plate | £ 4.00 |
| **OAK Personal Computer Model 3** | |
| Detachable keyboard case<br>Processor case<br>Keyboard coiled data cable<br>BBC B Plus motherboard<br>BBC B keyboard<br>BBC power supply | £ 535.00 |
| **OAK Personal Computer Model 4** | |
| Detachable keyboard case<br>Processor case<br>Keyboard coiled data cable<br>BBC B Plus motherboard<br>BBC B keyboard<br>BBC power supply<br>Dual 100K single sided disc drives | £ 735.00 |
| **OAK Personal Computer Model 5** | |
| Detachable keyboard case<br>Processor case<br>Keyboard coiled data cable<br>BBC B Plus motherboard<br>BBC B keyboard<br>65 watt PSU<br>Dual 400K double sided disc drives | £ 950.00 |
| **OAK Personal Computer Model 6** | |
| Detachable keyboard case<br>Processor case<br>Keyboard coiled data cable<br>BBC B Plus motherboard<br>BBC B keyboard<br>65 watt PSU<br>Dual 400K double sided disc drives<br>6502 2nd processor | £1150.00 |
| **OAK Personal Computer Model 7** | |
| Detachable keyboard case<br>Processor case<br>Keyboard coiled data cable<br>BBC B Plus motherboard<br>BBC B keyboard<br>65 watt PSU<br>Dual 400K double sided disc drives<br>Z80 2nd processor, CP/M operating system, Word processor, Spreadsheet, Graphics, Database, Accountant, System Generator, CIS Cobol, BBC Basic (Z80) | £1325.00 |
| **Optonal Extras** | |
| Econet | £ 75.00 |
| Multi function OAK modem and software | £ 135.00 |
| Fan | £ 45.00 |
| Monochrome Monitor (Illustrated) | £ 89.00 |

Models can be supplied incorporating BBC B internals from £435.00. Telephone for further details. All other specifications are available. All prices shown above are exclusive of VAT and delivery.
Delivery (Cases and Systems) £12.00 (3 day service)
Delivery (Keyboards) £6.00 (3 day service)
Europe Insured Postage (Cases and Systems) £26.00

← **ORDER FORM**

OAK UNIVERSAL LTD, 20 Crofters Green, Green Lane, Idle, Bradford BD10 8RR

UCC

**SPECIAL**
**TEAC 55F 40/80 400K**
SWITCHABLE DISC DRIVE
**ONLY £159.95**

LOW POWER
HALF HEIGHT
DISC DRIVE UNITS 400K
TEAC'S advanced technical features and reliability are the main reasons for TEAC being the most popular disc drives for use with the BBC computer.

**STYLE A**
**UCL 4080C £159.95**

**STYLE C**
**UCL 4080DS £299.95**

**STYLE E**
**UCL 4080BB £354.95**

**INTEGRAL POWER SUPPLY EXTRA £32.50**

Disc Drive Units come complete with:-
● All metal cases colour matched to BBC ● Ribbon cable to connect to BBC micro ● Power cable to connect to BBC micro ● Power cable to mains where PSU is fitted
● Manual/formating disc ● Full 12 months warranty ● Price includes VAT, postage.

**POWER SUPPLY UNIT STAND ALONE**

STRONG METAL CASE
MATCHING BBC COLOUR
Powers up to two disc drives including Dual Disc Drive connecting cable. Mains power lead and plug

**£45**

PRICE INCLUDES VAT, DELIVERY• & PACKAGING.

**S·P·Q·R**

**NEW TYPESETTING QUALITY PRINT FOR THE CANNON PW 1008A PRINTER.**

SIMULATED PRINT QUALITY ROMAN
Our disc-based software produces a Roman style font which is designed to produce a print out as near as possible to typesetting, using WORDWISE, proportional spacing mode.

**£11.95**

**MONITOR STANDS**

**£27.50**

**MONITOR STAND**
**WITH SHELF FOR DISC DRIVES**

**£55.00**

**MONITOR STAND**
**WILL TAKE 2 DRIVES AND POWER SUPPLY**

**£16.50**

**ALL MONITOR STANDS**
STYLED AND COLOUR MATCHED TO BBC STRONG METAL CONSTRUCTION
PRICES INCLUDE VAT, DELIVERY & PACKAGING

**HOW TO ORDER**
BY POST:- To purchase any of the items simply fill in the coupon with your requirements. Enclose your Cheque/P.O. or use your Access/Visa card. Please make cheques payable to Universal Communication Co. and post to the address shown. Allow 14 days for delivery.

BY TELEPHONE:-
Ring (0274) 614167. Credit Card holders (Access/Visa only) can purchase by telephone. Please give Card No., Name, Address and the items required.

Post to: **Universal Communications Co., 20 Crofters Green, Green Lane, Idle, Bradford BD10 8RR**
Please send me your dealer price list ☐ your educational price list ☐ Please send me details of your Easy Payment Credit Plan ☐
Please send me the following
I enclose Cheque/P.O. for £ ______ Inc. P&P + VAT.
Cheques payable to Universal Communications Co.
I prefer to pay ACCESS/VISA (Delete whichever is not applicable).
Card No.
Signature
Name
Address
Credit cards valid if signed by card holder. Address below must be the same as card holder.
TEL: 0274 614167

# Watford Electronics

**Dept. BBC, Jessa House, 250, Lower High Street, WATFORD, ENGLAND**
**Tel: Watford (0923) 37774/40588 Telex: 8956095 WATFRD**
**Credit Card Orders TEL: ACCESS (0923) 50234 VISA (0923) 33383**

**All Watford products now available in Holland from:**
**First Ludonics International, 2400 AJ Alphen aan den Ri jn,**
**Nedherlands. Tel: 01720 72580**

## BBC Micro 'B'
## Only: £289

**Price includes FREE 5 games software packages**

### BBC MICRO 32K + 32K

(extra 32K RAM Card already fitted)

Only: **£348**

| | |
|---|---|
| **BBC B PLUS** | **£399** |
| BBC B with Watford DFS | **£339** |
| BBC B with Acorn DFS | **£335** |
| BBC B with Watford DDFS | **£355** |
| BBC B with ECONET | **£335** |
| BBC B + DFS + ECONET | **£395** |
| BBC B + DFS + 32K RAM Card | **£397** |
| BBC B + 13 ROM Board fitted | **£322** |
| BBC B + 32K RAM + 13 ROM Board | **£379** |
| BBC B + DFS + 32K RAM + 13 ROM Board all fitted | **£429** |

Complete BBC B ECONET Networking System now available.
(ROM based software purchased with any of the above Micros will be fitted FREE of charge if specified).

| | |
|---|---|
| 6502 Acorn 2nd Processor | **£175** |
| Z80 Acorn 2nd Processor | **£339** |

| | |
|---|---|
| TORCH Z80 Card + Perfect Software | **£275** |
| TORCH Z80 Card+Soft. + Disc Pack | **£550** |
| TORCH GRADUATE Z80 System | **£900** |

| | |
|---|---|
| Acorn Bitstick | **£325** |
| Acorn IEEE Interface Complete | **£280** |
| Acorn Teletext + Interface | **£195** |

(Securicor carriage on Micros £7)

### Dust Cover for BBC Micro

**£3.50**

### VARIOUS PRINTERS

| | |
|---|---|
| ● EPSON RX80 Printer | **£209** |
| ● EPSON RX80 F/T Printer | **£219** |
| ● EPSON RX100 | **£342** |
| ● EPSON FX80 Printer | **£315** |
| ● EPSON FX 100 Printer | **£429** |
| ● EPSON JX-80 Full Colour Dot Matrix Printer. Prints in 7 Colours. Upto 160 cps | **£499** |
| ● EPSON Paper Roll Holder | **£17** |
| ● FX80 tractor attachment | **£37** |
| ● Centronics Printer Cable to interface all the above Printers to BBC | **£6** |

(Securicor carriage charge on printers £7)

### EPSON LX-80 PRINTER

EPSON's new Low cost High performance printer. Print speed 100 cps, NLQ mode 22 cps. 9 needle print head. Full FX-80 capability is supported with downloadable fonts. Friction feed is supplied as standard, with tractor feed and an attractive auto sheet feeder as optional extra. NLQ Mode and current typeface selectable from front panel.

Introductory price: **£220** (carr £6)
Tractor Feed Attachment **£20**
Single Sheet Feeder **£49**

### 4 COLOUR PLOTTER PRINTER

SAKATA SCP-800 printer/plotter facilitates plotting & printing in 4 colours on paper upto A4 size, using easily replaced pens. In text mode it prints upto 12 CPS. Max 160 Char. per line. In graphics mode it offers full plotting facilities incl. drawing, moving, scaling of text, rotation & drawing of axes. (Write for a sample printout).

**Only £175**

Set of 4 SPARE PENS only **£3.95**

### SPECIAL OFFER

HITACHI EPROMs for Sideways ROMs

**2764-250nS £2.25**
**27128-250nS £3.25**

RAMs (Low power) for ATPL, WATFORD, etc., Sideways ROM Boards

**6264LP (8K) £4.30**
**2 × 6264LP (8K) £7.99**

### PRINTER SHARERS

Connects

| | |
|---|---|
| 3 BBC Micros to 1 Printer | **£65** |
| 6 BBC Micros to 1 Printer | **£129** |

### BROTHER HR-15

Brother HR15 is a high-quality daisy-wheel ideal for a budget printer for serious use. Notable features of this printer include a 3k buffer, 18cps (max), bi-directional proportional spacing, Centronics interface standard, (RS232 optional), optional Sheet Feeder and Keyboard.

ONLY **£315** (carr. £7)

| | |
|---|---|
| Single Sheet Feeder | **£185** |
| Electronic KEYBOARD | **£135** |
| TRACTOR FEED Attachment | **£84** |

RIBBON CARTRIDGES:
Fabric **£3.75;** Carbon **£3.75;**
Multistrike **£6**

| | |
|---|---|
| DAISYWHEELS (various typefaces) | **£18** |

**We are now offering at no extra cost ON-SITE 12 months maintenance on all HR15 Printers purchased from us. W.E. GIVES YOU A GREAT DEAL**

### Listing Paper (Perforated)

| | |
|---|---|
| 1,000 Sheets 9½" Fanfold Paper | **£7** |
| 2,000 Sheets 9½" Fanfold Paper | **£13** |
| 1,000 Sheets 15" Fanfold Paper | **£9** |
| Teleprinter Roll (Econo paper) | **£4** |

Carriage on 1,000 Sheets £1.50

### PRINTER LABELS
**(On continuous fanfold backing sheet)**

| | |
|---|---|
| 1,000 90×36mm (Single Row) | **£5.00** |
| 1,000 90×36mm (Twin Row) | **£4.90** |
| 1,000 90×49mm (Twin Row) | **£7.50** |
| 1,000 102×36mm (Twin Row) | **£6.25** |

Carriage on 1,000 Labels £1.00

**All prices exclude VAT**

## KAGA KP810 NLQ PRINTER

This excellent printer is fully Epson FX-80 compatible and offers superb NLQ printing. Over the last year, we have sold more of these printers than any other make. Write in for further details of this printer.

Special Offer: ONLY **£229** (£7 carr.)

| | |
|---|---|
| Kaga RS232 Interface | **£49** |
| Kaga RS232 Interface + 2K Buffer | **£69** |
| Kaga RS232 Interface + 16K Buffer | **£95** |

### KAGA KP910 Printer

Similar to the KP810 but with 17" carriage for wide print. Gives 156 columns of normal print or 256 columns in condensed mode. Ideal for printing out spreadsheets.

ONLY **£339** (£7 carr.)

### PRINTER LEAD

Centronics lead to connect BBC micro to EPSON, KAGA, SEIKOSHA, NEC, STAR, JUKI, BROTHER, SHINWA etc. printers.

| | |
|---|---|
| Standard length (4 feet long) | **£6** |
| Extra long (6 feet long) | **£9** |

We can supply leads to any required length.

**RS232 Cables** available in any length and any combination. Please telephone for your requirement.

### PRINTER RIBBONS & VARIOUS DUST COVERS

| Type | Ribbons | Dust Covers |
|---|---|---|
| RX100/FX100 | £10.00 | £5.25 |
| FX80/MX80 | £4.50 | £4.95 |
| RX80 | £4.50 | £4.50 |
| GP80 | £4.50 | – |
| GP100 | £4.95 | £3.95 |
| GP250 | £5.95 | £3.95 |
| KAGA KP810 | £5.95 | £4.75 |
| CANON PW1080 | £5.95 | £4.75 |
| MICROVITEC MONITORS | – | £5.50 |

Our attractive Dust Covers are manufactured from translucent PVC. The seams are stitched and edges are taped to prevent splitting due to continuous use.

### SEIKOSHA SP-1000

This new attractively finished dot matrix printer features **Near Letter Quality** mode and is unsurpassed at the price. Provides high quality printout for word-processing, whilst retaining a fast mode (80 CPS) for draft copies. Other features include a variety of character sets, underlining, bold print and double strike, bi-directional logic seek, automatic paper loading, variable paper width etc. Friction Feed; Tractor feed optional extra. SP800 makes available the facilities of much more sophisticated printers at a very reasonable price.

Introductory price: **£189** (carr £6)

### EPSON HI-80 PLOTTER

The latest addition to the popular range of EPSON Printers/Plotters. Prints in upto 10 colours. Has many more features. Please write in for spec sheet.

**£345** (£7 carr.)

## RX & FX PRINTER INTERFACES

Epson interfaces fit inside the printer to allow connection using techniques other than Centronics.

| | | | |
|---|---|---|---|
| RS232 | £25 | RS232 + 2K Buffer | £55 |
| IEEE 488 | £62 | | |

We stock a range of monitors to suit all needs. Choice of a monitor is a matter of personal taste so we recommend that whenever possible, you ask for a demonstration at our shop.

### MICROVITEC

| | |
|---|---|
| ● 1431 – Medium resolution as used on the BBC television computer programme | £185 |
| ● 1451 – High resolution, suitable for word processing in mode 0 | £229 |
| ● 1441 – High res, exceeds the capabilities of the BBC micro | £385 |
| ● 1431AP RGB + PAL and AUDIO | £199 |
| ● 1451AP RGB + PAL and AUDIO | £269 |
| ● Dust Cover for Microvitecs | £5.50 |

All Microvitec Monitors are 14" and are supplied complete with cables.

### KAGA

| | |
|---|---|
| ● KAGA KX1201G Hi-res Green Monitor | £90 |
| ● KAGA KX1202G Ultra-Hi-Res Green Monitor | £105 |
| ● KAGA KX1203A Ultra-Hi-Res Amber Monitor | £105 |
| ● KAGA Vision 2, Hi-Res, RGB Colour Monitor | £225 |
| ● KAGA Vision 3, Ultra Hi-Res, RGB Monitor | £310 |

## FIDELITY COLOUR MONITOR

- Medium Resolution, attractively finished, 14" RGB and Composite VIDEO/AUDIO Input. Has a detachable anti-glare screen. Supplied complete with cables.

Introductory Offer: **£169**

### ZENITH

12" high resolution monochrome monitor. Ideal for word processing as its green or amber screen is very restful to read. The high resolution makes it good for games too – you can really see the detail that has been put into the graphics **£66**

### LEADS

| | |
|---|---|
| **BNC Lead for Zenith or Philips** | £3 |
| RGB lead for KAGA | £3 |

**N.B.** Carriage on Monitors **£7** (securicor)

## CENTRONICS NLQ PRINTER

Centronics, the World famous name in printers, combines with Brother to produce the GLP printer. (Oh, by the way, GLP stands for Great Little Printer – and it certainly is!)
The Centronics GLP provides the personal computer user at a low cost, a high quality compact printer with features usually found only in much more costly units.

- Centronics interface
- Lightweight
- NLQ printing
- Bidirectional draft printing
- Superscript
- Subscript
- Underlining
- Emphasized print
- Condensed print
- Double strike print
- Self test
- Friction feed

Introductory price: Only **£129** (carr £5)

Tractor Feeder **£10**

## BBC MICRO WORD-PROCESSING PACKAGE

A complete word-processing package (which can be heavily modified to your requirements, maintaining the large discount). We supply everything you need to get a BBC micro running as a word-processor. Please call in for a demonstration.

**EXAMPLE PACKAGE**
BBC Model B, Watford Electronics' DFS upgrade, WORDWISE ROM, Twin 400k Epson drives in beige, Zenith 12" Hi-resolution monitor (Green or Amber), Brother HR15 daisywheel printer. Gemini software: BEEBCALC spreadsheet, analysis and DATABASE software on disc. 10 × 3M disc, 500 sheets fan-fold paper, 4 way mains trailing socket, manuals, all leads and BBC carrying case.

**NEW LOW PRICE**

**Only £999**

**CREDIT CARDS**
**24 HOUR HOT LINES**
**ACCESS 0923 50234**
**VISA 0923 33383**

## THE EPSON RX/FX/KAGA PRINTER COMMANDS REVEALED

So you bought yourself a new printer, because the salesman in the shop showed you how clever it is and impressed you with all sorts of printouts to show its capabilities – he may even have offered you a special price.

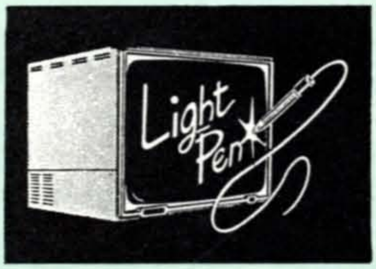
However, now that you have got it home and connected it to your BBC microcomputer, you are wondering how to make it perform these magical tasks. The manual seems to give no clues, and when you type in the example programs, the computer throws the LPRINT statements back in your face.

Now what do you do, when this £400 piece of high technology refuses even to move its head, and you have stayed up until 2 in the morning with copious supplies of coffee, desperately trying to print something out. Once again, Watford Electronics comes to your help with our new book entitled 'THE EPSON FX/KAGA PRINTER COMMANDS REVEALED'.

This book describes in plain, easy to understand English how to use your printer (Kaga KP810, Canon PW1080A, or any other Epson FX-80 compatible printer) with the BBC micro, both from Basic and your Wordwise wordprocessor.

It describes in detail how to obtain the maximum in graphics capability from your printer and includes full indexes allowing you to cross index the numerous commands. Every command is explained in detail, with an accompanying BBC Basic program and an example of its use from Wordwise.

This book is superb value at only **£5.95** (Book – No VAT)



This Light Pen for the BBC micro is packaged in a neat pen shape with built in switch. Supplied complete with our sophisticated Pen-Pal software on cassette.

Only **£23**
(For software on disc please add £2)

# Nightingale Modem

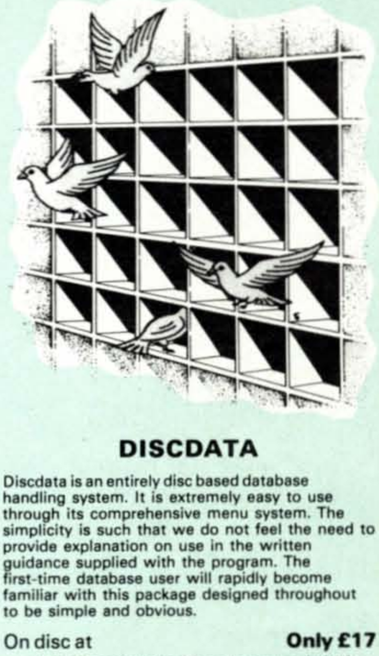
SPECIAL PRICE to our Customers

**£119**

(Price includes COMMSTAR ROM & comprehensive manuals)

| | |
|---|---|
| Nightingale Modem without software | **Only £99** |
| COMMSTAR ROM package only (P&P on modem £2.00) | **£29** |
| Auto Dial/Auto Answer Board | **£48** |
| Auto Dial Utilities Disc | **£9.50** |
| OBBS Bulletin Software | **£20.00** |

## DATABASE MANAGEMENT SYSTEMS



### DISCDATA

Discdata is an entirely disc based database handling system. It is extremely easy to use through its comprehensive menu system. The simplicity is such that we do not feel the need to provide explanation on use in the written guidance supplied with the program. The first-time database user will rapidly become familiar with this package designed throughout to be simple and obvious.

On disc at **Only £17**

(Please specify 40 or 80 track when ordering)
(Please write in for technical specifications)

### FILE-PLUS

File-Plus is a powerful database for the BBC micro with many advanced features. Largely menu driven, File-Plus is provided on a 16k ROM with some extra utilities on disc. Features included are detailed below:

- Flexible full screen form layout.
- Built in File Query Language (FQL).
- Printer Output.
- Arithmetic operations in FQL.
- Looping in FQL.
- Number range of +– 9999999999.9999.
- File linking allows files over different drives.
- Multiple forms allow selection of displayed data.

**Only £36**

(Please specify 40T or 80T disc

### DATAGEM

Gemini's 24K ROM based
DATABASE Management System
Special Offer: **£69**

Continued →

# *Le Modem*

### The MODEM from Watford

*At last a professional MODEM for the BBC Micro. Unlike other 'Modem packages' this is a complete package there are no extra software costs to get 'up and running'. Of course Le MODEM is multi-standard, i.e. 300/300, 1200/75 UK and BELL (USA) are all supported.*

*The features that make Le MODEM such good value are:*

- *A complete communications terminal that transforms your BBC Micro into a very powerful World/wide data transfer system.*
- *Auto Dials, Auto Answers, Auto Baud selects and is completely controlled by your Micro. There are no external controls!*
- *Allows you to access PRESTEL, B.T. GOLD, THE SOURCE, MICROLINK, MICRONET, MICROWEB, THE TIMES NETWORK, MICRO LIVE (BBC TV database), CITY BB and more.*
- *Designed to be SIMPLE but SOPHISTICATED. To LOGON to a data base all you have to know is its TELEPHONE NUMBER, Le MODEM does the rest.*
- *Supplied with a comprehensive telecomms package in a 16K sideways ROM which includes a FULL PRESTEL terminal allowing TELESOFTWARE to be downloaded.*
- *A comprehensive 80 column terminal. This includes XMODEM error checked transfer protocol, to allow error free data transfer anywhere in the world!*
- *FULLY controlled by simple *COMMANDS allowing you to control it from your own BASIC programs. To get you started we supply a FREE disc of bundled software!*
- *Connects to the 1MHz bus. A *AUDIO ON/OFF command allows you to actually hear the telephone line through your BBC micro loudspeaker.*
- *Completely self contained with internal mains power supply. (Even a free mains plug is fitted!) A *TEST facility gives ON SCREEN indication that Le MODEM is working correctly.*
- *Packaged in such as way that you need nothing else except a BBC Micro to communicate with computers all over the world.*
- *BT Approval applied for.*

Launch Price: Only **£89** (carr £3)

(Price includes Software ROM, Cables and Manual)

---

## Watford ROM/RAM CARD

### A must for all serious users

We, at Watford Electronics, have been producing high quality hardware and software products for the BBC for three years now. Having carefully observed the needs of our customers we set our top hardware engineer the task of producing the ultimate ROM board to meet all your ROM/RAM requirements.

After weeks of top secret development we are now able to bring you more details of this, the ultimate in ROM/RAM boards.
● No overheating problems. ● No User Port corruption. ● Full buffering. ● NO SOLDERING. ● Firmly mounted. ● Easy fitting. ● Up to 8 banks of 16k of Dynamic RAM. ● One bank of 16k CMOS Static RAM allowed. ● All RAM has Write protect. ● All CMOS RAM has Read protect. ● CMOS RAM can have battery backup. ● Special RAM write register. ● Can run any BBC ROM. ● FREE utilities disc. ● Compatible with DDFS boards. ● Compatible with our 32k RAM Card. ● Compatible with our Sideways ZIF. ● Large printer buffer (up to 128k) ● High speed disc backup via RAM.
Obviously, so much RAM requires some powerful facilities to use. To show you just how powerful the features our board offers are, and to convince you that the competition if any, is just simply not worth buying, we shall provide some more details on the advanced features offered.

Each socket has write protection to allow all ROM based software to be run. Also, to help during software development, each socket is equipped with a special read protect facility (this allows recovery from ROM crashes).
Up to 8 ROMs and 8 banks (each of 16k) of RAM may be used, or one of the ROMs may be configured to give 16k of battery backed CMOS Static RAM.

The RAM socket selection (which is independent of the normal ROM socket) is performed by a special register at &FF30. In normal systems, a "write" to this location would have no effect. We believe that there is available an inferior board in which, for some totally unexplained reason, the User Port (as used by the AMX Mouse, Eprom Programmers, etc.) is used for the selection. Obviously this was not a very sensible move on the part of this manufacturer.

The ROM/RAM card from Watford represents second generation ROM board technology and is a must for all serious users of the BBC Micro.

Please write in for technical details and further prices.

**INTRODUCTORY PRICES:**

| | |
|---|---|
| ● ROM/RAM CARD with 32K Dynamic RAM | **£45** |
| ● ROM/RAM CARD with 64K Dynamic RAM | **£69** |
| ● ROM/RAM CARD with a massive 128K RAM | **£109** |

**OPTIONAL EXTRAS:**

| | |
|---|---|
| ● 16K Plug-in STATIC RAM | **£14** |
| ● Battery for Battery Backup on Static RAM | **£2** |

# The ULTIMATE DFSs for the BBC MICRO

### WATFORD TOPS THE DFS CHART

**Watford's Ultimate DFS has scored highest points in ACORN USER's unbiased DFS's Review of July 1985.
In concluding, the reviewer writes "It must be said that Watford's DFS certainly offers a comprehensive range of facilities at a very attractive price". (Please write in for comprehensive details.)
To celebrate the occasion, we are offering Watford's complete Disc Interface Kit at only £59 and the Double Density Unit at £66.**

*Just compare the features:*

| Features | Acorn<br>1.20 | Watford<br>Single Density | Watford<br>Double Density |
|---|---|---|---|
| Max nos. of files per disc side | 31 | 62 | 62 |
| Max disc capacity | 800k | 800k | 1440k |
| Tube compatible | Yes | Yes | Yes |
| Built-in Editor | No | Yes | Yes |
| Built-in Formatter | No | Yes | Yes |
| Built-in Verifier | No | Yes | Yes |
| MRUN a file | No | Yes | Yes |
| MLOAD a file | No | Yes | Yes |
| Extended RENAME | No | Yes | Yes |
| Selective COPY | No | Yes | Yes |
| Default file name | No | Yes | Yes |
| Disc space distribution | No | Yes | Yes |
| 40/80 Software Switchable | No | Yes | Yes |
| Wide catalogue | No | Yes | Yes |
| Close open files | No | Yes | Yes |
| Improved OPENOUT | No | Yes | Yes |
| Copy between densities | N/A | N/A | Yes |
| OSWORD &7F | Yes | Yes | Yes |
| Full entry point compatibility | Yes | Yes | Yes |
| Retain information over a break | 1.20 | 1.43 | 1.53 |
| | partial | Yes | Yes |
| Games compatibility | Yes | Yes | Most |
| Econet file server | Yes | Yes | Yes |
| Econet station | Yes | Yes | Yes |
| Full wildcard facilities | No | Yes | Yes |

## WATFORD's & ACORN's SINGLE DENSITY DFS

*Watford's popular and widely acclaimed DFS has now been available for two years, and has gained a large following amongst serious users of the BBC Micro. Owners of Acorn or any other standard DFS can upgrade to our "Ultimate" DFS merely by replacing their DFS ROM. See below for this upgrade.*

**PRICES**

| | |
|---|---|
| ● *Complete Disc Interface Kit incl. DFS ROM & fitting instructions* | **£59** |
| ● *Acorn's DFS Kit complete* | **£60** |
| ● *DFS Manual (Comprehensive)* *(no VAT)* | **£6.95** |
| *(P.S. Our comprehensive DFS Manual covers both Acorn & Watford DFSs)* | |
| ● *Watford's sophisticated DFS ROM only* | **£16** |
| ● *We will exchange your existing DFS ROM for Watford's Ultimate DFS ROM for only* | **£12** |

● *Watford's DFS is exclusively available from Watford Electronics. Every ROM carries a special label with our LOGO and serial number.*

---

## WATFORD's DOUBLE DENSITY DFS INTERFACE

*The DDFS from Watford Electronics represents a new standard in DFSs for the BBC micro. This is a double density version of our popular single density DFS, and combines all the features of this powerful DFS with the advantages of a system that gives 80% more storage per disc in double density mode.
P.S. – Please note that not all DDFSs are capable of providing either the full 80% storage increase, or of allowing a file the full size of the disc – Ours allows both of these!*

*The typical piece of games software these days is provided upon a protected disc. In order to work on any double density system (including the others on the market) a protected piece of software needs to make calls through the OSWORD &7F routines. To ensure compatibility, the Watford DDFS features probably the most comprehensive and powerful 8271 emulation ever written for a double density system.*

**PRICES**

| | |
|---|---|
| ● *Complete DDFS Kit incl. fitting instructions* | **£66** |
| ● *DDFS Manual* *(no VAT)* | **£6.95** |
| ● *We will exchange your existing Single Density DFS Kit for our DDFS Unit at* | **£35** |

# Quality Disc Drives from Watford Electronics

*To help you decide which drive is the most suitable for your needs (and your pocket!), we have produced the table below.*

*The first capacity given in the first column indicates the single density capacity. The double density storage capacity is second one, (that within the brackets). All disc Drive type numbers start with the prefix "C".*

*The tinting on some of the boxes is used to indicate which Drives are 40 track and which are 80 track. The 40 track ones are manufactured by EPSON, the world famous Japanese company, (non-tinted boxes). The 80 track drives are famous MITSUBISHI drives (tinted boxes).*

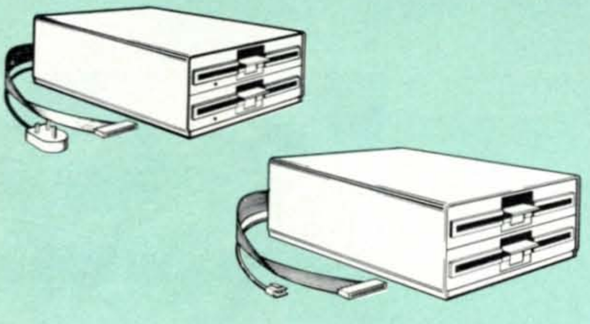
*With two prices in a box (e.g. £295/£299), the first price is for the standard drive and the second for the same unit in switchable type. Users of either of the two Watford DFSs will not need switchable drives as their DFS will provide software switching for them. Users of Acorn's DFS will find that they need to pay the extra for switchable drives if they wish to use 40 track discs in an 80 track drive.*

*The drives we supply are fast (3ms track to track, 15ms settle), quiet and have a low power consumption (average well under 1 amp). Extensive experience of the usage of disc drives suggests that the MITSUBISHI and EPSON drives currently represent about the best in terms of speed, reliability and overall "elegance" available for the BBC Micro.*
*Various other "manufacturers" of disc drives for the BBC micro (more accurately, "packagers" label other manufacturers drives with their own name). We buy the high quality Epson and Mitsubishi drives in large quantities directly from the manufacturers, package them and sell them at "dealer" prices direct to the public.*

## Names you can trust, at prices you can afford!

*If you look around the popular BBC micro press, you will find that the prices we quote for the top quality, new slimline disc drives are, virtually without exception, some of the best around. These prices, coupled with the backup of one of the country's largest distributors of BBC peripherals provides a superb deal.*
*Unless you anticipate using dual drives in a fully expanded BBC system for long periods of time with little ventilation, then we suggest that our range of "CL" disc drives without the PSU (Power Supply Unit) would be quite adequate: extensive tests within our workshops have confirmed this. All drives are supplied complete with a SPECIAL UTILITIES Disc, Cables and Plugs. The Drives with power supply have a mains moulded plug for safety purposes. (Ideal for Schools & Colleges. All single disc drives with power supply, (i.e. CS100, CS200 & CS400S) are supplied in a twin case with twin data cable for later inclusion of a second drive). At Watford we anticipate your needs of tomorrow not just today!*

*All disc drives advertised here will operate in double density mode with the appropriate interface and software.*



| Capacity | Drives without P.S.U. | | Drives with P.S.U. | |
|---|---|---|---|---|
| | Single | Twin | Single | Twin |
| 100K (180K) | CLS100 £82 | | CS100 £105 | |
| 200K (360K) | CLS 200 £84 | CLD200 £162 | CS 200 £107 | CD200 £172 |
| 400K (720K) | CLS 400 £99 / £115 CLS400S | CLD 400 £162 | CS400 £109 / £130 CS 400S | CD400 £175 |
| 800K (1.44M) | | CLD800 £189 / £230 CLD 800S | | CD800 £199 / £235 CD 800S |

- TWIN drive CASE, with Power Supply & Cables **£35**
  Securicor carriage on Disc Drives £5

*Prefix* *C = Cased Drive*
*L = Less PSU*
*S = Single*
*D = Double*

*Suffix* *S = 40/80 Switchable*

*e.g.* *CLS400S = Cased drive, Less power supply unit, Single 400K, Switchable (40/80 track).*

## MYSTERIES OF DISC DRIVES & DFS REVEALED

Are you tired of faulty cassettes, and lengthy loading times? Do you want to upgrade your BBC micro to take discs but you get tied up in the plethora of jargon surrounding the choice and use of these systems.

For instance, what is the difference between single and double density formats, how can you use a 40 track disc on an 80 track disc drive? What is the difference between a DFS and disc interface kit? Should you acquire a single Disc drive or twin? What does 48 TPI and 96 TPI discs mean? These are just a few of the questions you may have asked yourself and never found the answer or maybe you have yet to encounter these questions.

Now the mystery of buying a suitable interface and disc drive for your BBC micro is revealed in Watford's new book entitled 'MYSTERIES OF DISC DRIVES & DFS REVEALED'. It describes in fine detail, yet remaining very readable to the beginner, how disc drives operate, the type of interfaces available, which type of discs to use on a disc drive and how data is stored on the discs.

**£5.95** (Book No VAT)

## 3M – 5¼" DISKETTES

*Top quality 3M – SCOTCH Diskettes from Watford Electronics (Your 3M Appointed Distributors). All our discs carry a lifetime warranty. These discs are quiet in operation and insert positively with their reinforced hub rings. Boxes of 10 supplied complete with self stick disc labels and write protect tabs.*

| | |
|---|---|
| ● *10 × S/S D/D 40 Track Diskettes* | **£13** |
| ● *10 × D/S D/D 40 Track Diskettes* | **£18** |
| ● *10 × S/S D/D 80 Track Diskettes* | **£22** |
| ● *10 × D/S D/D 80 Track Diskettes* | **£24** |

## QUALITY 5¼" DISKETTES at KNOCK DOWN PRICES

To complement the range of quality discs and disc drives that WE already sell, WE are now supplying some special offer packs of 10 high quality discs, each with a life-time guarantee. These are supplied packaged in an attractive plastic library disc box to protect them from damage.

**DON'T SETTLE FOR LESS, BUY THE BEST**

| | |
|---|---|
| ● *10 ×* **M4** *S-S D/D 40 Track Discs* | **£11** |
| ● *10 ×* **M5** *D/S D/D 40 Track Discs* | **£15** |
| ● *10 ×* **M7** *D/S D/D 80 Track Discs* | **£20** |

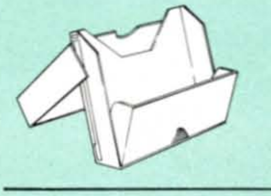
## DISC ALBUMS

Attractively finished in beige leather-look vinyl, these conveniently store upto 20 Discs. Each Disc can easily be seen through the clear view pockets. **£4**

## LOCKABLE DISC STORAGE UNITS

Strong plastic case that afford real protection to your discs. The smoked top locks down. Dividers and adhesive title strips are supplied for efficient filing of discs.

| | |
|---|---|
| M35 - holds upto 40 discs | **£10** |
| M85 – holds upto 95 discs | **£12** |



## PLASTIC LIBRARY CASES

FOR 5¼" DISC STORAGE
holds 10 Discs. **£1.80**

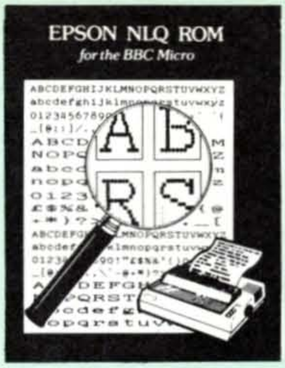
## FLOPPY HEAD CLEANER KIT

The heads in floppy drives are precision made and very sensitive to dirt. The use of a cleaner Kit is a sensible precaution against losing valuable data. It is recommended to clean the drive head once a week. It is very simple to use. **£8**

## DUST COVERS (For our Disc Drives)

| | |
|---|---|
| Single (without PSU) **£3.20** | Twin (without PSU) **£3.85** |
| Single (with PSU) **£3.25** | Twin (with PSU) **£3.90** |

**Continued** →



Impress your friends and business colleagues with the quality of your letters and printed material with Watford's very simple to use EPSON NLQ! (Near Letter Quality) ROM. Suitable for FX80, RX80, RX80F/T, FX100.

Look at the features:

- Simply type *NLQ80/100 and a single VDU code to use NLQ print.
- NLQ is then available without any modifications from BASIC, WORDWISE, VIEW (with NLQ DRIVER) or virtually any other program or language.
- Single codes select PROPORTIONAL type (yes even on the RX80); ENLARGED type; UNDERLINED type. These features can be used seperately or in any combination.
- Full UK character set; Standard 'pica size'; Proportional spacing; Enlarged; Underlined; Normal type.

The NLQ ROM is supplied complete with comprehensive manual.

P.S. NLQ ROM is compatible with the Torch Z80 system and can be used from within the Perfect Writer software.

**Only: £22**

## VIEW PRINTER DRIVER for NLQ ROM

This specially written printer driver has been designed to allow View access to the full features of our NLQ ROM.
A must for all VIEW and NLQ ROM users.

**£7.00**

## THE NLQ DESIGNER

The Kaga Taxan KP810 and KP910 are two superb printers, as our many thousands of satisfied customers would surely attest to. One of it's particularly strong points is the NLQ option that it offers; perhaps one of the more weaker points is the effort required to design your own custom NLQ font.

Well the solution is here NOW in the shape of Watford's NLQ DESIGNER ROM! This powerful piece of software allows easy design and entry of a full NLQ font, with further fonts recallable from disc. Once a font has been programmed with the versatile NLQ DESIGNER, it can be saved to disc, downloaded to your Kaga (or Canon) printer, or even programmed into an EPROM (given the appropriate hardware) and then plugged directly into your printer so that it is available immediately when you turn it on. Downloadable Fonts require 6264 RAM chip fitted.

A 40/80 track format disc containing 3 example fonts is included in the package.

(P.S. This ROM is not suitable for Epson printers as they don't normally have NLQ ability. Keep reading our adverts though – work is in development!)

NLQ DESIGNER & FONT DISC **£25**

INDIVIDUAL Preprogrammed FONT ROMS **£15**

(Please write in for further details on both the NLQ DESIGNER and the individual font ROMs available.)

## DUMPOUT 3

A highly sophisticated screen dump ROM. This has to be the most flexible and powerful screen dump ROM yet produced for the BBC micro. It will put on paper anything you see on the screen, including all Mode 7 facilities etc. We have to admit that there is one facility that we cannot replicate – if anyone can supply flashing ink we would like to know!
The ROM also provides window setting utilities and two new OSWORD calls that allow mode 7 graphics pixels to be read and plotted using the standard graphic co-ordinate system. The latest version includes a graphic dump trigger for dumping screens from games whilst they are running.
Two commands are used to operate the dump routines:
*GIMAGE – This provides a full graphics dump of any graphics mode, plus modes 7 and '8'. There are many optional parameters but you need only specify the parameters you wish to change.

Features available include:

- Vertical and horizontal scaling through all the graphic modes and mode 7
- Rotation of the image produced through 90, 180 and 270 degrees
- Left hand indentation setting
- Screen dump window definition
- Colour grey scaling
- Two tone fast dump
- Special colour mask
- Mode 7 contrast expansion
- Mode 7 contiguous dump
- Key triggered dumps
- User port switched dumps

What does the independent press say!

*Practical Electronics, May 1985*
"The Dump Out 3 ROM from Watford Electronics represents one of the most sophisticated types of printer dump utilities available for the BBC Micro . . .".

"an extremely sophisticated and powerful dump utility".

"VERDICT – Dump Out 3 ROM has all the facilities which you are ever likely to need for producing printer dumps. The facilities available work extremely well and if printer dumps are something which you require, then this ROM can be recommended to help you to get the best out of your dot matrix printer".

*The Micro User Feb. 1985.*
"Well, here is that winner"!

"provide(s) some rather sophisticated screen dumps. Producing high resolution paper copies of graphic screens in any (graphics) mode will be the major reason for buying this ROM, and this is where Dump Out 3 performs PAR EXCELLENCE". (Our capitals for their italics.)

"The versatility of *GIMAGE (the graphics dump command) when using these parameters is amazing. Pictures of almost any size, shape, contrast or distortion may be produced without the need for a reducing photocopier or trick photography".

"Without reservation I wholeheartedly recommend the Dump Out 3 ROM as the ultimate screen dump facility for the BBC micro. It is easy to use yet highly versatile, and caters for all BBC screen modes in multitone high resolution printing. Whole, partial, rotated and scaled screens may be dumped to almost any BBC compatible dot matrix printer (see our list at the end of this advert). At £24 it must represent excellent value for money and surely cannot be beaten".

Designed for use with the following printers: CP80, GP80/100/250, CANNON, STAR, KAGA/TAXAN, NEC, SHINWA CP80, GEMINI, EPSON MX/RX/FX, LPVII, NEC PC8023, DMP100/200/400, etc. etc.
Price including comprehensive manual

**£24**

## VIEW

**VIEW WORDPROCESSOR**
We are supplying the new VIEW version 2.1 allowing printing of memory contents etc ..... **£46**

## HI-VIEW

A special version of VIEW designed for use with 6502 2nd Processor. Available on disc, it offers 47K of text memory.

**£49**

**VIEWSHEET (Acornsoft) £49**

**VIEWSTORE £52**

### Watford's own Sophisticated VIEW PRINTER DRIVER for Epson FX80 & KAGA KP

**Only £9**

### VIEW DRIVERS FOR JUKI & BROTHER PRINTERS

**Only £8**

### VIEW/VIEW SHEET PRINTER DRIVER for SILVER REED

**(Officially approved by Silver Reed)**

A range of VIEW Printer drivers to complement the Silver Reed range of printers EXP400/500/550 & 770 EB 50 and converted typewriters EX43/44 & 55.

**Only: £8**

## BEEB PRINTER ROM

"Makes Printing Childs Play"

This utility ROM is designed to simplify using all the facilities of your printer. It has many facilities:

★ Selection of printer modes such as underline, font and size is by 'Single Key' operations.

★ From Wordwise, a single number following OC will select a mode rather than a long and incomprehensible string of control codes. This makes using your printer with Wordwise much more convenient.

★ When using Basic (or other languages) you can have control over the formatting of the output to the printer in the style of a wordprocessor. You can define page top, bottom and side margins etc. with intelligent page skip for binders an option. All supported printers will now respond to form-feed etc. commands.

★ User defined characters are printed as you see them on the screen so that non-standard characters are automatically printed out correctly.

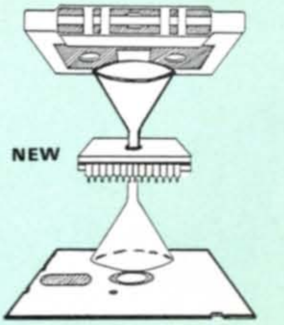
★ Commands select the options for the following printers:
GP100, STAR, NEC, MX/FX, KAGA, LP/VII/DMP100, DMP200.
Operates with either parallel or serial interfaces.

★ Supplied with a 50 page manual that is very comprehensive and easy to follow. Please specify printer type when ordering so that we can send the correct function key strip.

**Price: £24**

## TRANSFEROM

**(Tape to Disc Utility)**



The only TAPE to DISC Utility ROM that works with our Double Density Disc Interface.

After months of top secret development, we are now able to supply details of this advanced and sophisticated utility ROM for the BBC micro. Just look at the features:

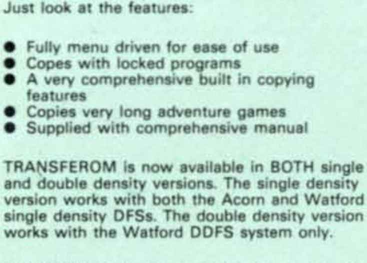
- Fully menu driven for ease of use
- Copes with locked programs
- A very comprehensive built in copying features
- Copies very long adventure games
- Supplied with comprehensive manual

TRANSFEROM is now available in BOTH single and double density versions. The single density version works with both the Acorn and Watford single density DFSs. The double density version works with the Watford DDFS system only.

TRANSFEROM takes your software on tape and saves them onto disc. TRANSFEROM does not stop when one disc is full; you just insert another disc in and carry on with that one! Surely this is the most valuable investment you could make if you have tape software that you wish to transfer to disc! Please specify version required – Single or Double Density.

**£22.00**

## DIAGNOSTICS DISC



The BBC micro is a very complex machine and thus diagnosing a fault can be very difficult. Until now, the only way to discover the nature of a fault was either to find a competent friend with a large degree of patience or to find your nearest dealer and pay him to find out what is wrong.

At Watford Electronics, we realise how difficult it can be when faced with a problem, finding yourself a long way from your nearest dealer, or even just uncertain about your Beeb's health, but not wanting to waste time and money taking it to be looked at.

The solution to these problems is here now, in the form of the Watford's Diagnostics Disc. This excellent utility is specially designed to test out the following areas of your Beeb:

RAMs, ROMs, ULAs, Sound, Keyboard, Disc, RS423, ADC, User Port, Printer Port, Cassette, Joysticks, Speech, Disc Drives, 6502 and Z80 2nd Processors.

**Continued**

This utility is an invaluable aid for all those who take the reliability of their system seriously. A comprehensive manual provides full operating details and a list of possible causes and remedies for any faults that you may find along the way. The package also enables a permanent equipment and service record to be maintained.

**Only £18.00**

## ROMAS

### THE CROSS ASSEMBLER AND MACRO EDITOR FOR SERIOUS PROGRAMMERS!

NEW
ND
6502
HEX
REM
ASM
CHR$
FAL
LD
Z80

ROMAS is a carefully designed, sophisticated yet simple to use, development system for serious assembly language programmers. Using the BBC as the development system, you can choose your target system from the following processors:

6502, 65C02, Z80, 8085, 8041, 6809 and Z8 P.S. This includes the Acorn 6502 & Z80.

ROMAS features a powerful expression analyser, making complex table easy to generate. To aid in documentation, fully formatted assembly listings may be produced, with full symbol table output at the end.

ROMAS is provided with a powerful cross referancer to produce a listing of all the labels in a given "source" program; this makes it easy to check to see if you are about to duplicate a label.

### The Macro Editor

Features of this powerful editor provided with the ROMAS package include:

- Works in all 40 and 80 column screen modes
- Fast load and save speeds
- Continuous line and column number displays
- Search, replace and move; all available in macros
- Command repetition

The ROMAS package includes a comprehensive manual, providing detailed documentation and plenty of examples.

A give away at . . . **Only £45**

Please specify 40 or 80 track disc when ordering.

## ADE

'Systems' complete program development package in a 16K ROM. We are now supplying the new 6502 2nd processor compatible version.

SPECIAL OFFER ONLY **£43**

## ULTRACALC 2

The mark 2 version of the BBC Publications' extremely popular electronic spreadsheet ROM.

Only: **£66**

## THE INVESTIGATOR

This sophisticated Utility program on disc, enables you to make security back-up copies of most of your valuable Disc Software. Makes full use of all 8271 (will not run with double density DFSs) facilities to discover the precise format of your protected disc so that an exact copy can be produced. Supplied with detailed instructions. Please specify 40 or 80 track disc when ordering.

Only **£20**

## ROM-SPELL

NEW
ENGLISH DICTIONARY
ROMSPELL

ROMSPELL is the new fast Spelling Checker ROM from Watford. Packed with excellent features, ROMSPELL is probably the most advanced spelling checker available for the BBC micro.

Features include:

- 30,000 word dictionary
- One pass check
- Two pass check
- Ambiguous word check
- Basic access to ROMSPELL
- Immediate entry check

ROMSPELL is fantastic value at **£23**

*(Please specify 40 or 80 tracks when ordering)*

## BEEBMON

BEEBMON is the most powerful and versatile machine code monitor from Watford Electronics. BEEBMON offers some superb features specially designed to make the task of understanding and debugging machine code easier; indeed BEEBMON is probably the only product with sufficient power to aid in the debugging of such complex pieces of software as a DFS.
Offering a total emulation mode, BEEBMON can be used to single step through code anywhere in memory. All breakpoints are emulated and the workspace is totally relocatable, allowing for the simulation of all those "awkward" pieces of code.

**£24**

## DISASSEMBLER ROM

Discover the hidden secrets of BASIC and the OPERATING SYSTEM with this easy to use progammers tool.

ONLY **£16**

Please write in for technical details.

## ROM MANAGER

Probably the most powerful way of expanding the BBC micro is from the use of Sideways ROMs. One problem faced by the avid ROM collector is that of ROM command clashes. The solution is very simple in the form of the ROM that "Provides comprehensive management of all your installed ROMs". (Quote from BEEBUG November '84.)

Basically, ROM Manager offers you the ability to turn off any installed ROM, or to send any * command to any specific installed ROM. It is said that imitation is the sincerest form of flattery – Acorn's BBC Plus features many of the abilities of this powerful ROM.

Many more facilities available.

Price **£20**

## DISC EXECUTOR

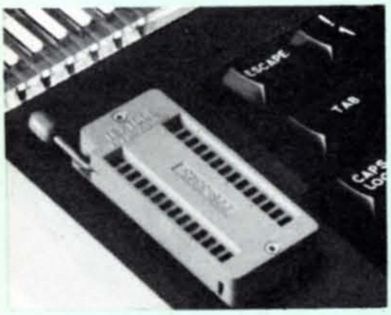
**Disc Executor** is a sophisticated disc utility for the transfer of your programs from cassette to disc. It copes with 'locked' files and full length adventures (up to &6E blocks long) and programs that load below &E00. Disc Executor is simple to use and provides menus to prompt the user along the way. Disc Executor will cope with the vast majority of tapes. (Please note that Disc Executor is not compatible with double density disc interfaces – keep reading our adverts though!)

Price only **£10** (40 or 80 track)

## CLARE's SOFTWARE

| | |
|---|---|
| BROM ROM | **£29** |
| BROM DISC | **£23** |
| BETA ACCOUNTS PACK | **£21** |

## SIDEWAYS ZIF SOCKET



Now Watford Electronics brings you a ROM board for small budgets or for those of you who do not wish to open up your Micro frequently. It allows you to change ROMs quickly and efficiently with the minimum of effort – no screws to loosen or keyboard to remove. The unit consists mainly of a zero insertion force (ZIF) socket on a small circuit board which is located into the position of the 'ROM Cartridge' and is connected to one of the internal ROM sockets via a ribbon cable.

- Very simple to install. NO SOLDERING REQUIRED. The ZIF eliminates the possibility of damage to your ROM pins when inserting and extracting them.

- The low profile of the socket allows unrestricted access to the keyboard, unlike other cartridge systems. In addition, there are no costly extras, such as ROM cartridges for every new ROM.

- All data and address lines are correctly terminated to ensure correct operation of suitable ROMs with the BBC micro. We also supply a purpose designed see-through storage container with anti-static lining, allowing you to store up to 12 ROMs, protecting them from mechanical and static damage.

- This versatile hardware solves the problem of running out of socket space, simply unplug the ROM and plug in a different one. It is a real must for Professionals and Hobbyists alike.

ONLY **£15**

## 16K Sideways RAM Modules

This is it! The revolutionary design RAM Module you've been waiting for. Complete with such features as read and write protection, these new modules from Watford Electronics are ideal for the hobbyist, software developer and ROM collector.
Key points to note about this new addition to the Watford range of products are:

- Write protection (useful in a variety of circumstances).
- Read protection (allows recovery from ROM crashes).
- Compact construction.
- May be fitted in systems even with a ROM board.
- Multiple units may be fitted, even with a ROM board.
- No overheating or overloading problems.
- Free utilities disc supplied.
- Can be used as a 16K PRINTER BUFFER.
- Works with any ROM.
- Ideal for professional software development.
- Writes in &8000 to &BFFF region go to RAM.
- Assemble and *LOAD ROMs straight in to RAM.
- Supplied with utilities software disc.

Introductory offer: **£29**

**Optional extras**

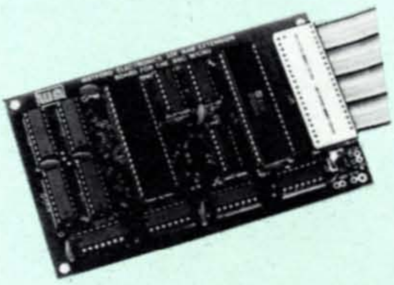
| | |
|---|---|
| READ and WRITE protect Switches | **£2** |
| **BATTERY BACKUP** | **£2** |

## LOGOTRON LOGO

The popular Logotron Logo in ROM. Recommended by most Education authorities.

**Only: £55**

# 32K RAM-
# PRINTER BUFFER
## EXPANSION BOARD



A MUST FOR WORD PROCESSING

Watford Electronics now brings you the latest state-of-the-art MEMORY EXPANSION BOARD for your BBC microcomputer. Just plug the ribbon cable into the 6502 processor socket, and fit the compact board inside the computer. Immediately you will gain not 16K or even 20K, but a massive 32K of extra RAM!!!

- IMPROVE your WORD PROCESSING system, whether disc or cassette based. Don't wait for a slow printer – type in text while printing. TWO JOBS DONE SIMULTANEOUSLY and £100+ saved on a printer buffer.

- In "VIEW", type in letters in 80 columns and have up to 28,000 bytes free – 5 times as much as normal.

- In WORDWISE (or WORDWISE-PLUS), preview in 80 columns with the full 24K of text in memory. This superb product is recommended by Computer Concepts for use with both Wordwise and Wordwise Plus. We wholeheartedly agree with this commendation.

- Combine GOOD GRAPHICS and LONG PROGRAMS. Use the top 20K of the expansion RAM as the screen display memory, leaving all the standard BBC RAM free for programs. Benefit from MODE 0/1/2 graphics and 28K of program space.

- Use the FULL 32K or the bottom 12K of the expansion RAM as a PRINTER buffer for PARALLEL or SERIAL printers, sound channels, RS423 etc. Print large text files while running long graphics programs and have all your buffer options available as well (*FX15,21,138,145,ADVAL etc). Only 12K Buffer can be used in Wordwise or Wordwise + because of the way these softwares are written.

- Ensure COMPATIBILITY with a vast range of hardware (including Watford & ATPL ROM boards, double density boards, second processors), and software (including BASIC, TOOLKIT, VIEW, WORDWISE (1.20+), WORDWISE-PLUS). This is because our board, unlike those of our competitors, is connected to the computer by a ribbon cable.

- Achieve EASY OPERATION with ROM based software. A large range of commands is available for machine code and BASIC users, including some useful *HELP messages.

**Offer price**

**Only: £60**

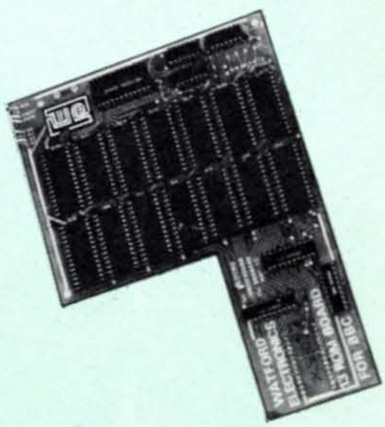
(Price includes a comprehensive manual and the ROM)

## GRAPH PAD

With this popular British Micro's Graph-pad, you can add new dimensions to your computer enjoyment. It helps you to create your own application programs by the simple use of the Graphpad. Ideal for Educational use. Supplied complete with Cables, Manual and a two program cassette.

SPECIAL OFFER **£86**

## Mk-3 13 ROM SOCKET EXPANSION BOARD



**We are pleased to announce a revised version of our popular 13 ROM SOCKET board, now with even more features.**

- Increase BBCs capacity for ROMs from 4 to 16.
- Easy installation; simply plug in with only 5 wires to solder.
- Minimal space needed.
- Compatible with our DDFS, RAM Card, Torch card, 2nd Processors, etc.
- Advanced low power chips keeps power consumption to a minimum.
- Very versatile Socket 14 can take 2716, 2732, 2764, 27128, 6116 and 6264 chips.
- *LOADs or writes in the region &8000 to &BFFF are automatically directed at the RAM.
- Auto-write protect line makes RAM look like ROM.
- READ protect line which makes socket 14 "vanish" – useful to get out of software crashes.
- On-board battery back-up option with a high speed charging circuit.
- Supplied ready-built and tested, complete with fitting instructions.

**Price: Still Only £30**

## SOLDERLESS SIDEWAYS ROM SOCKET BOARD

Following the success of our 13 ROM SOCKET BOARD, we are proud to announce a new addition to our range – the New Solderless Sideways ROM Socket Board.

This brand new board from Watford Electronics is designed specifically for those wishing to add a ROM board to their own BBC without the need to perform any soldering.

This new board expands the total possible number of ROMs in a BBC from 4 to 16. Also permissable, are various configurations of RAM (up to 16K) and different sized EPROMS (see below).

- The key features of this new, no fuss, easy to install quality product from BBC leaders Watford Electronics are as follows:
- Increase your BBCs capacity for ROMs from 4 to 16.
- No soldering required.
- Very low power consumption.
- Minimal space required.
- Compatible with Torch, DDFS, RAM Card, 2nd Processor, etc.
- Socket 14 can take the following chips: 2716, 2732, 2764, 27128, 6116, 6264.
- Auto write protect for RAM chips.
- Read protect to make RAM "Vanish"; allows recovery from ROM crashes.
- Battery backup option for RAM chips.
- Supplied ready to fit with comprehensive instructions.

**Price: Only £33**
Battery backup fitted **£35**

## COMPUTER CONCEPT'S ROMS

| | |
|---|---|
| ACCELERATOR | £55 |
| CARETAKER Basic Utility | £28 |
| Graphics ROM | £28 |
| Disc Doctor ROM | £28 |
| INTER-SHEET | £48 |
| INTERCHART | £38 |
| TERMI | £27 |
| COMMUNICATOR | £58 |
| SPEECH ROM | £25 |

## Wordwise

Without doubt a very sophisticated piece of software for the BBC Micro. It has all the features of a professional word processor yet is easy to use.

SPECIAL OFFER: **£32**

## WORDWISE PLUS

FREE this month, the superb Word-Aid ROM with every package of Wordwise Plus bought from us **£47**

## Word-Aid

### The most comprehensive utilities ROM for Wordwise-Plus

Take advantage of the programming language in Wordwise-Plus. Simply load the disc with Shift-Break and have the power of these sophisticated new features instantly at your fingertips.

**Features:**

- Mail Merger
  - Can use Data files spooled from Wordwise-Plus.
  - Can use Data files from most databases.
  - Powerful Label printing facilities.
  - Mail merges with names, addresses etc. inserted into a standard letter.
- Address Finder
  - Search for names.
  - Search for addresses.
  - Insert names into text.
  - Insert addresses into text.
- Print/Preview continuous files.
- Chapter Marker.
- Search and Display.
- Remove embedded commands.
- Text transfer.
- Printer Codes – make embedding commands easier.
- Utilities supplied compressed for speed.
- Utilities supplied anotated for help.
- Supplied on 40/80 format disc.
- Very user friendly.
- Recommended by Computer Concept.

Introductory Offer: **£12**

(Further details available on request SAE, please).

## BEEBFONT ROM

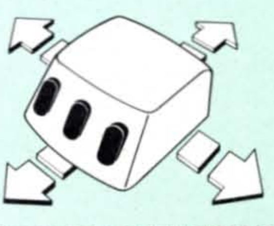
BEEBFONT is a remarkable and different concept in BBC software. It allows you to display text on the screen in 13 different styles. It is supplied complete with a Spooler and Editor on 40 or 80 track disc.
(Please write in for technical details).

ONLY **£25**

**PCB NI-CAD Battery for ROM Boards. £2**

# THE AMX MOUSE

The AMX Mouse needs no introduction. It is simply the best.



**Now supplied with the NEW SUPERART Software ROM & Disc at no extra cost.**

## ONLY: £67.95

We are giving away the sophisticated **COLOUR ART** Software package **ABSOLUTELY FREE** with every purchase of the AMX Mouse from us.

| | |
|---|---|
| AMX DESK Package | £19.00 |
| AMX UTILITY Package | £11.50 |
| AMX SUPERART Package | £43 |
| AMX PAGE-MAKER Pack | £43 |
| AMX 3D ZICON Disc | £21 |
| AMX Database Disc | £21 |
| AMX XAM Educational | £21 |

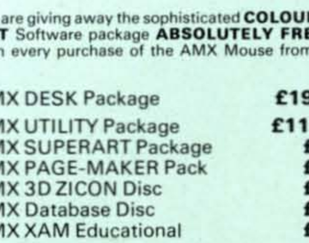
## COLOUR ART

This novel program allows you to add COLOUR to any drawing produced with your AMX Mouse package, and really brings those pictures alive. Not with just any colours, mind you, but a full range from up to 255 different shades! It's simplicity itself to use this "painting by numbers" painter to create simple, striking and powerful images to please the eye.

Price **£10**

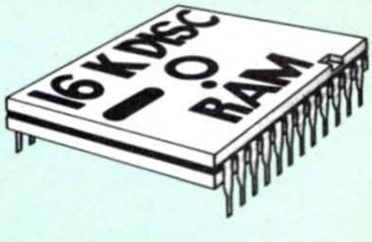
(please specify 40 or 80 track disc when ordering)

## PLINTHS FOR BBC MICRO AND PRINTERS



Protect your computer from the weight and heat of your monitor. The BBC micro plinths have slots for maximum ventilation. The single plinth is suitable for a BBC and monitor, whilst the double height version provides enough room for our stacked or side-by-side dual disc drives or TORCH Disc pack, to be placed in the centre section. If you use our stacked drives, the remaining space can be used for further peripherals e.g. Speech Synthesizer, EPROM programmer or simply stationery. The computer slides neatly in to the lower section allowing easy access to remove the lid. The printer plinth is equally sturdy but without the cooling slots. It allows for access to the paper from the front as well as from the rear, (a facility not often thought of in similar products) if the paper is located beneath the plinth. This is a very convenient way to work especially if your work area is not deep enough to take the printer and paper separately.

| | | |
|---|---|---|
| SINGLE BBC PLINTH ................ | **£11** | (carr. £1.50) |
| DOUBLE BBC PLINTH ............... | **£19** | (carr. £2.00) |
| PRINTER PLINTH ...................... | **£10** | (carr. £1.50) |



This is the RAM you've been waiting for!! This battery backed up, write protectable 16K sideways RAM board allows you to run from disk every sideways ROM available. Beware of other sideways RAM boards which are not backed up as certain ROMs will not run in these boards even though the RAM can be write protected. The Battery Backup facility allows retention of DATA after power off. On switch on the Micro will think the WATFORD DISC RAM is a ROM. Features available are:

- No soldering or modifications to BBC micro necessary.
- Plugs into normal ROM socket fitting neatly under the keyboard allowing room for other add-ons.
- Easy to use. Comes with disk based software to SAVE and LOAD ROMs. Allows you to make backup copies of your ROMs.
- Disk software can be copied onto other discs when disc is full.
- All existing ROMs can be stored on disk and used in DISC RAM.
- No messy plugging and unplugging of your ROMs. Simply Load the one you want into DISC RAM.
- Ideal for Professional users to develop ROMs. Backup facility allows testing of final versions without using EPROMs.
- The switch provided allows backup and write protection to be switched off externally.
- Can also be used as 16K printer buffer RAM in conjunction with our Buffer & Backup ROM.

## New Low Price: £30

P.S. 16K DISC RAM Board is not designed to work in conjunction with a Sideways ROM Board.

## Versatile **BEEB SPEECH SYNTHESISER** Unit

Beeb Speech Synthesiser

The Watford Speech Synthesiser is a very flexible speech synthesis unit based upon the powerful phonemes system. This system stores the building blocks of speech (called phonemes) and allows you to combine them quickly and easily to form virtually any word imaginable.

Supplied with an advanced ROM, you are provided with a 500 word dictionary to get you started. These can easily be added to by following the notes given in the comprehensive manual.

**SPECIAL PRICE £32**

Continued →

## BOOKS (No VAT on Books)

| | |
|---|---|
| 21 Games for the BBC Micro | £5.95 |
| 30 Hour BASIC (BBC Micro) | £6.95 |
| 35 Education Programs for BBC | £6.95 |
| 100 Programs for BBC Micro | £6.95 |
| 6502 Assembly Language Program | £13.95 |
| 6502 Assembly Language Subroutines | £19.95 |
| 6502 Machine code for Humans | £7.95 |
| 68000 Assembly Lang. Programming | £19 |
| A young persons guide to BBC Basic | £4.50 |
| Advanced Machine Code Technique for BBC | £7.95 |
| Advanced Programming for the BBC Micro | £6.95 |
| **Advanced User Guide for BBC Micro** | £11.95 |
| Advanced Graphics with BBC | £9.95 |
| Advanced 6502 Programming | £12.45 |
| Assembly Language Programming on BBC Micro | £7.95 |
| Advanced Programming Techniques for the BBC Micro | £7.95 |
| Applied Assembly Lang. for BBC | £7.95 |
| Assembler Routines for the 6502 | £ |
| Assembly Language Programming FOR the BBC Micro | £8.95 |
| Assembly Programming made Easy | £5.95 |
| Basic ROM User Guide | £9.95 |
| BBC BASIC for Beginners | £7.95 |
| BBC BASIC | £5.95 |
| BBC Forth | £7.50 |
| BBC Hardware Projects | £8.95 |
| BBC Machine Code Portfolio | £7.95 |
| BBC MICRO add on guide | £6.95 |
| BBC Micro An Expert Guide | £6.95 |
| BBC Micro Assembly Language | £7.95 |
| BBC Micro Book BASIC Sound & Graphics | £7.95 |
| BBC Micro Games Master | £5.95 |
| BBC Micro Graphics and Sound | £6.95 |
| BBC Micro Programs in Basic | £5.95 |
| BBC Micro ROM Book | £9.95 |
| BBC Micro **ROM PAGING** System Explained | £2.00 |
| BBC Micro Revealed | £6.95 |
| BBC Micro Disc Companion | £7.95 |
| BBC Micro in Education | £6.50 |
| BBC User Guide | £10.00 |
| BBC Wargaming | £8.95 |
| Basic Programming on BBC Micro | £5.95 |
| BCPL User Guide | £15 |
| Brain teasers for BBC micro | £5.95 |
| Business Applications on BBC | £7.95 |
| Computing for All the Family | £6.45 |
| CP/M Bible | £16.00 |
| CP/M Handbook with MPM | £13.95 |
| CP/M Soul of | £14.95 |
| CP/M The software BUS | £8.95 |
| Creative Animation & Graphics | £7.95 |
| Creative graphics on BBC Micro | £7.50 |
| **DISC FILING SYSTEM (DFS) Operating Manual for BBC** | £6.95 |
| Disc Programming Techniques | £7.95 |
| Disc System for the BBC | £6.95 |
| Discover BBC Machine Code | £6.95 |
| Discover FORTH | £13.95 |
| Easy Programming for the BBC Micro | £5.95 |
| Electron Machine Code for Beginners | £6.95 |
| Exploiting BBC Basic | £6.95 |
| Exploring FORTH | £6.95 |
| Filing System & Databases | £7.95 |
| Further Prog. for BBC Micro | £5.95 |
| FORTH on the BBC Micro | £7.95 |
| Forth Programming | £14.40 |
| Functional Forth for the BBC Micro | £5.95 |
| Games BBC Computer Play | £6.95 |
| Getting more from your BBC & Electron | £6.95 |
| Graphics for Children | £7.95 |
| Graphs & Charts on BBC Micro | £7.50 |
| Graphic Art for BBC Computer | £5.95 |
| Hackers Handbook | £4.95 |
| Handbook of Procedure & Functions for the BBC Micro | £6.95 |
| Interfacing Projects for the BBC | £6.95 |
| Introducing the BBC Micro | £5.95 |
| Introducing LOGO | £5.95 |
| Introduction to FORTH | £8.95 |
| Introduction to PASCAL | £16.50 |
| Let your BBC teach u to program | £6.45 |
| LISP | £9.25 |
| LISP, A Beginners Guide to | £10.95 |
| LISP Cassette | £15.50 |
| Logo Programming | £8.95 |
| **Mysteries of DISC DRIVES and DFS REVEALED** | **£5.95** |
| Mastering CP/M | £16.50 |
| Programming the 6502 | £13.95 |
| Programming the BBC micro | £6.95 |
| Programming the Z80 | £16.95 |
| Programming with Graphics | £5.95 |
| Structured Prog. with BBC BASIC | £6.50 |
| The Complete FORTH | £6.95 |
| The Complete Programmer | £5.95 |
| **The Epson FX/KAGA PRINTER Commands REVEALED** | **£5.95** |
| Using Floppy Discs with BBC Micro | £5.95 |
| Using BBC Basic | £6.95 |
| Wordstar & CP/M made easy | £6.95 |

---

## *BEEB VIDEO DIGITISER*

Using any source of composite video (colour or monochrome) and the Watford Beeb Video Digitiser, you can convert an image from your camera into a graphics screen on the BBC Micro.

This uses the full graphics capacity of the BBC micro in modes 0, 1 or 2. The video source may be a camera, video recorder or television, and is connected via the video output socket.

Images produced can be compressed, stored to disc, printed on an Epson compatible printer, directly used to generate graphics, analysed for scientific and educational use or converted to other formats e.g. Slow Scan TV or receiving a picture from a remote camera using a modem.

The output from the digitiser exactly matches the graphics capability in each mode, with up to 8 levels of grey in mode 2. The unit connects into the User Port and automatically scans a complete picture in 1.6 seconds.

Both the black and white levels can be adjusted manually for the optimum picture, or switched to automatic for unattended use. The image produced can be reversed if necessary.

Full controlling software is supplied on a normal sideways ROM and this is easily accessed via additional * commands. The package is designed to allow easy input of complex screens and give full access of the data to the user. Once on the screen, the image can be used as a normal graphics screen, allowing any of the usual graphics commands in BASIC or other ROM's to work on it.

A special print dump routine is included with the driver programs. This is specially designed to produce a fast, correctly proportioned picture, with reduced "contouring", resulting in an accurate reproduction of the original image.

Features offered by this package include:

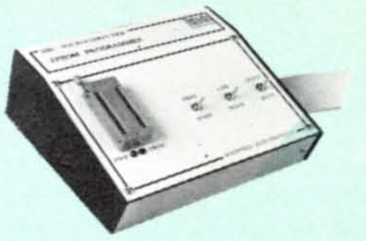
- The adding of pictures or written text to typed documents.
- Unattended recording of scientific data.
- Entry of real images into graphics programs.
- Generation of computer images.
- Slow scan television; sending images via a modem or radio.
- Security.
- Input from any video 1v video source.
- Full resolution in Modes 0,1 or 2.
- 1.6 seconds scan time.
- Up to 8 grey levels
- Manual or Auto level control
- Connects to user port

Detailed examples of driving this unit from BASIC or other languages are all provided in the extensive manual supplied.

**£95** (Carr. £3)

(Price includes: Digitiser Unit, ROM & a comprehensive Manual.)

## EPROM PROGRAMMER



The Watford Electronics' EPROM programmer for the BBC micro is a high quality self contained package. Programs all popular EPROMs from 2K to 16K: 2716, 2516, 2532, 2564, 2764 and 27128. All manufacturers' specifications have been followed to program EPROMs at the correct speed – wrong timings could destroy your EPROMs. The unit has its own power supply so does not put heavy loads on the BBC power supply as do some other units. Connects directly to the 1MHz bus following all Acorn recommendations on addressing and bus loadings.

**SOFTWARE PACKAGE**
The software is supplied on an EPROM which plugs into the Micro and is instantly available with a single command (no time wasting as on Cassette/disc loading). It is a fully purpose designed and ingegrated package to simplify ROM development. The system is menu driven with many prompts to avoid any accidents.

**Software facilities include:**
Load File – Save File – Down Load EPROM – Program EPROM – Verify – Blank Check – Editing of memory contents prior to programming.
Also included is an automatic system to allow Basic programs to be put in EPROM and accessed through the *ROM filing system. More than one program may be put in an EPROM. All these facilities and more are explained in the comprehensive and clear 15 page manual.

**SPECIAL OFFER £69**
(£3 carr.)

---

## LOW COST 'DIN' EPROM PROGRAMMER

A high performance, low cost, self contained 'DIN' EPROM PROGRAMMER for the BBC Micro. Plugs into the BBC Micro's user port.

The features are:

- Will program 2716, 2732, 2532, 2764 & 27128 EPROMs.
- Copy Eprom into memory and compute checksum.
- Blank check EPROM.
- Program EPROM from memory.
- Verify programmed EPROM and display checksum.
- All * commands may be used from menu mode.
- High speed programming on 2764 & 27128.
- Machine code SOFTWARE supplied in ROM.

Only: **£49.50** (carr. £2)

---

## TEX EPROM ERASERS

EPROMs need careful treatment if they are to survive their expected lifetime. Over erasure of EPROMs very rapidly turns them into ROMs! The TEX erasers operate following the manufacturers specifications to give the maximum possible working life by not erasing too fast. We use these erasers for all our own erasing work.

- **ERASER EB** – Standard version erases up to 16 chips. **£28**
- **ERASER GT** – Deluxe version erases up to 28 chips. Has automatic safety cut-off to switch off the UV lamp when opened. **£30**
- Spare UV tubes. **£9**

## VOLTMACE JOYSTICKS

| | |
|---|---|
| DELTA-14 JOYSTICK | **£12** |
| Adaptor Module | **£12** |
| Transfer Software | **£7** |

## ANTI GLARE MONITOR SAFETY SCREEN

HEADACHES? TIRED EYES? Don't take pills – Use a Watford Electronics anti-glare filter!

- Made in Britain by a long established glass maker.

Available in 12" & 14" versions – please specify the exact monitor type when ordering.

Special Price: **£13.00** (carr. £2)

## SURGE PROTECTOR Plug

Fitted in place of your normal mains plug, this device protects your equipment against mains surges. Nearby lightning strikes, thermostats switching and many other sources put high voltage transient spikes on to the mains. This can lead to data corruption in memory and on disc and can result in spuriously crashing machines. A must for every computer user.

Protection for only **£9.50**

## FLEXIBLE KEYBOARD CONNECTOR

A 'Keyboard to Micro' replacement jumper lead.

**£4**

## ATTACHE CARRYING CASE for BBC Micro

The Attache carrying case is attractively finished in mottled antique brown leatherette. The case is made of tough plywood, providing a very solid and safe way to carry your BBC micro. There is room provided to fit all the leads necessary behind the computer and manuals in the front.

Locks supplied with two keys. Price **£11** (£2 carr.)

## DATA RECORDER

Top quality slimline portable cassette recorder designed specifically for use with home computers. Mains/Battery operated with tape counter.

**£20**

**DATA CABLE** to connect recorder to BBC **£2.00**

### DATA CASSETTES

Top grade tested C12 Data cassettes supplied in library cases **35p** each; 10 for **£3.20.**

## CONNECTING LEADS

(All ready made and tested)

CASSETTE LEADS 7 pin DIN Plug

| | |
|---|---|
| to 5 pin DIN Plug + 1 Jack Plug | **£2.00** |
| to 3 pin DIN Plug + 1 Jack Plug | **£2.00** |
| to 7 pin DIN Plug | **£2.50** |
| to 3 Jack Plugs | **£2.00** |
| **6 pin DIN to 6 pin DIN Plug (RGB)** | **£2.50** |

### DISC DRIVE POWER LEADS

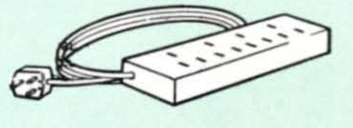
Supply from BBC power supply to standard Disc Drive connector.

Single **£3.00** Dual **£3.75**

## MISCELLANEOUS CONNECTORS

| | **Plugs** | **Sockets** |
|---|---|---|
| RGB (6 PIN DIN) | **30p** | **45p** |
| RS423 (5 pin Domino) | **40p** | **50p** |
| Cassette (7 pin DIN) | **25p** | **65p** |
| ECONET (5 pin DIN) | **20p** | **30p** |
| Paddles (15 pin 'D') | **110p** | **215p** |
| BBC Power Plug 6 way | **80p** | – |
| Disc Drive Plug 4 way | **75p** | – |

## 4 WAY MAINS DISTRIBUTION SOCKET



4 way top quality mains trailing sockets. Supplied wired up with mains plug ready for use. Can be screwed to floor or wall if required. Very useful for tidying up all the mains leads from your peripherals. Allows the whole system to be switched on from one plug.

**£9.99**

CREDIT CARDS 24 HOUR HOT LINES
ACCESS 0923 50234
VISA 0923 33383

## SPARES for BBC Micro

| | | | |
|---|---|---|---|
| Keyboard | **£46;** | Keystrip | **£2** |
| Power Supply | **£45;** | Case | **£25** |
| UHF Modulator | **£4;** | Speaker | **£2** |
| Speaker Grill | **£1;** | Keyswitch | **£2** |

**28 pin ZIF SOCKET (Textool)** **£6.95**

**28pin DIL HEADER PLUG**

| | |
|---|---|
| SOLDER type | **£1.50** |
| IDC CRIMP type | **£1.95** |

## RIBBON CABLE

28way **55p/ft;** 34way **60p/ft.**

**8way DIP SWITCH** **£0.85**

## CHIP SHOP

| | | | |
|---|---|---|---|
| 7438 | **40p;** | 74LS00 | **25p** |
| 74LS04 | **25p;** | 74LS10 | **25p** |
| 74LS123 | **80p;** | 74LS163 | **70p** |
| 74LS244 | **80p;** | 74LS245 | **£1** |
| 74LS393 | **£1.20;** | 4013 | **60p** |
| 4020 | **£0.90** | 4816 | **£1.00** |
| DS3691 | **£3.50** | DS88LS120 | **£3.00** |
| LM324 | **£0.45** | UPD7002 | **£4.40** |
| 6502A CPU | **£5** | 65C02 CPU | **£9.50** |
| 6522 | **£3.40** | 6845SP | **£6.75** |
| SAA5050 | **£8.75** | SN76489 | **£5.50** |
| 2764-250nS | **£2.25** | 27128-250nS | **£3.25** |
| 6116LP-2K | **£2.75** | 6264LP-8K | **£4.75** |
| 8271 | **£45** | ACORN DNFS | **£15** |
| ACORN OS 1.2 | **£6** | ACORN BASIC 2 | **£16** |

ACORN LOGO **£60** COMAL **£43**
ISO PASCAL **£60**
SLEUTH ROM **£25** TOOLKIT ROM **£23**
BBC A to B Upgrade Kit **£45**

**ROM EXTRACTION TOOL**
**£2**

NEW LAUNCH

# DELTA CARD

Delta is the latest in add-ons for the BBC Micro. Mounting internally, this unit provides a new CPU to run your programs at TWICE their original speed (i.e. a massive 4 MHz!). Even better than this, you can run applications programs such as Wordwise Plus, ViewSheet, Pascal, etc. at twice their speed. Whereas a 6502 Second Processor increases the speed of a standard BBC by about 50%, the combination of a BBC and Delta Card runs at twice the speed of a standard BBC! Unlike second processors, full compatibility is achieved with all standard software.

64k of fast RAM is provided on this card to allow for your program, Basic and the Operating System to all be stored in fast RAM, and hence run at maximum speed. Software available for this unique and powerful expansion card includes routines to load the currently selected language into the 16k of fast sideways RAM, alter the banking of the RAM to provide 'shadow' screen memory (as featured in our 32k RAM Card), provide a printer buffer, edit memory, etc.

Special Introductory Price
**Only £99** (carr £3)

## ALNOOR ARABIC ROM

Now available from stock, ARABIC ROM and Keytops for the BBC Micro. Please write in for further details.

## ACORN SPEECH SYNTHESIZER

Speech Chips, Manual and full fitting instructions

**Only £19**

# JOB VACANCY at Watford Electronics

Due to continued expansion at Watford Electronics, there now exists a vacancy for an experienced repair and test engineer to work in our workshops. The work is demanding and you should be capable of working under pressure.

Join the forefront of BBC technology with the hardware specialists for the BBC Micro.

There also exists a vacancy for a technical assistant. Applicants should be familiar with our range of products and have a reasonable command of written English.

Applicants to either jobs should send their CV to:

**The Personnel Manager at Watford Electronics.**

**Prices subject to change without notice and available on request.**

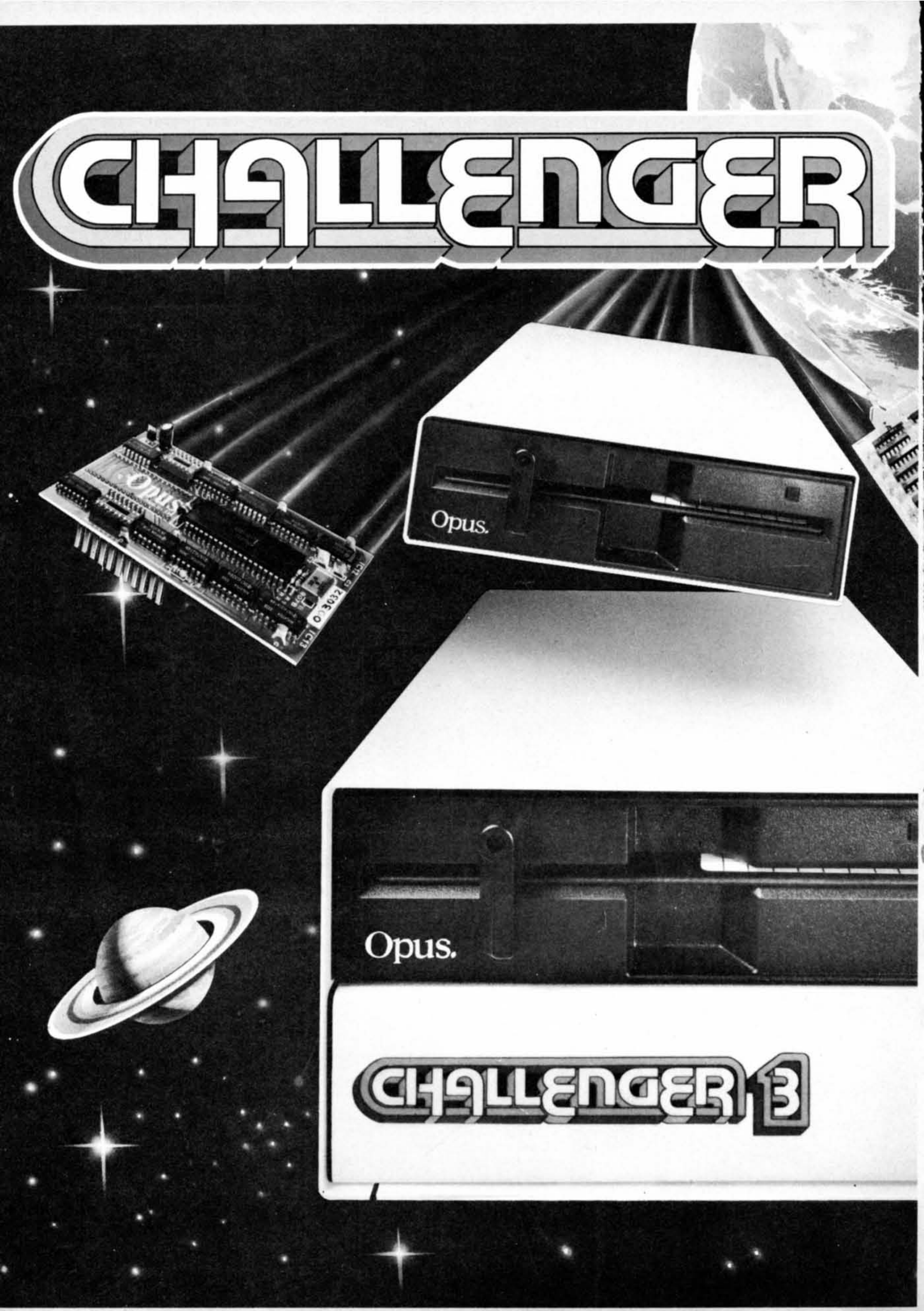
**MAIL ORDER AND RETAIL SHOP TRADE AND EXPORT INQUIRIES WELCOME. GOVERNMENT AND EDUCATIONAL ESTABLISHMENTS OFFICIAL ORDERS ACCEPTED. CARRIAGE: Minimum £1 on all cash orders. On bulky items, Securicor charge applies.**

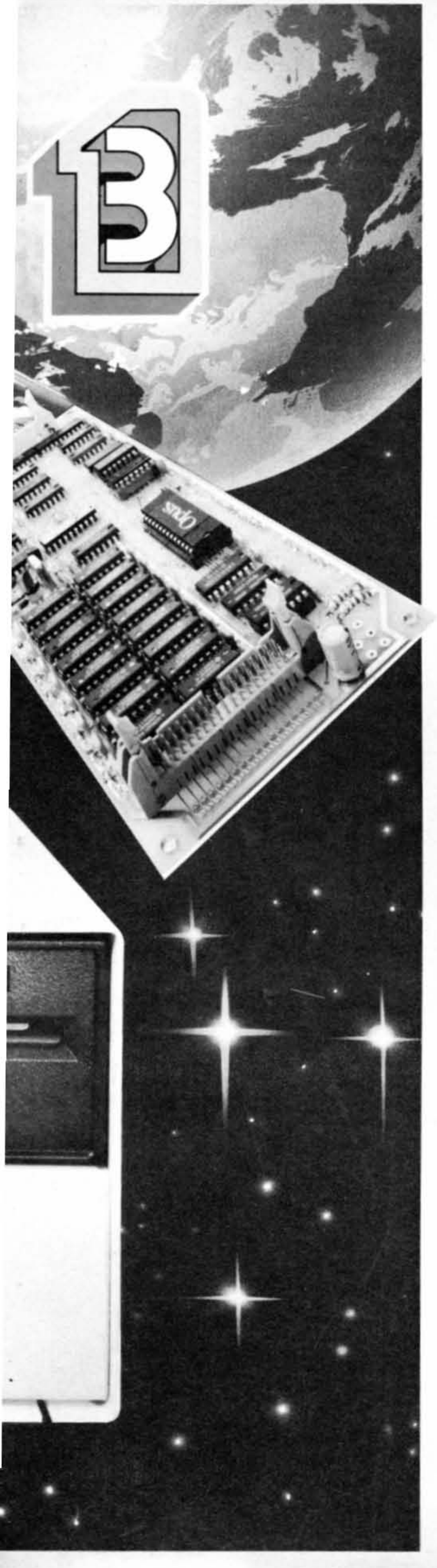
**VAT: UK customers please add 15% VAT to the total cost incl. Carriage.**

**SHOP HOURS: 9.00am to 6.00pm. Monday to Saturday. (Ample Free Car Parking Spaces)**

# Watford Electronics

**Dept. BBC, JESSA HOUSE, 250, Lower High Street, WATFORD, ENGLAND**
**Credit Card Orders TEL: ACCESS (0923) 50234 VISA (0923) 33383**
**Telex: 8956095 WAELEC**


CHALLENGER
Opus
Opus.
Opus.
CHALLENGER 3



# Simply light years ahead of the opposition

Opus announce the biggest disc drive breakthrough for years – CHALLENGER. It could make every other disc system for the BBC micro outdated overnight.

An amazing 3-in-1 design has produced Britain's first complete plug-in disc system for the BBC computer. No more complicated interface connections, soldering or track cutting, Challenger is an all-in-one disc system ready to plug straight into your computer. It's the simplest disc link-up ever and a winning combination that no other system can match.

**5¼″ DOUBLE-SIDED 40/80 TRACK DISC DRIVE**

**DOUBLE DENSITY DISC INTERFACE**

**SUPER FAST SOLID STATE RAM DISC** – Up to 20 times faster than disc drive and providing a massive 256 K of RAM

## ALL THIS IN A SINGLE UNIT FOR AN AMAZING £249.95

And just look at the storage capacity of this remarkable stand-alone system.

Our 5¼″ disc drive and built in double-density disc interface – an extended version of the highly praised Opus DDOS, voted fastest system by 'Acorn User' and favourite choice of 'A & B Computing' – combine to give you a powerful 1 Megabyte system. But Challenger has a third dimension, a super fast Solid State RAM DISC for instant access to an additional 256 K of RAM. Effectively a lightning fast second disc drive which can be upgraded to ½ Megabyte capacity for only £49.95. It makes Challenger superior to a dual disc drive, giving faster access and less wear and tear on your drive.

Challenger uses the same disc controller chip as the new BBC B+ computer making it compatible with all leading software titles. Call us for our full compatibility listing.

We've provided a selection of utilities on ROM and Challenger's disc drive is 40/80 track switchable. The extended DDOS takes no User RAM, PAGE, the position at which BASIC programs load, is left unchanged, normally staying at &OEOO, and Challenger dynamically moves files on the disc to overcome the 'can't extend' problem.

Challenger's price of £249.95 includes our unbeatable two year warranty, a full operating manual, VAT and free delivery. Call us now on 0737-65080 for details of our nationwide dealer network or simply post the coupon below.

## OPUS SUPPLIES THE DRIVE

The Opus disc drive range has few rivals for quality, reliability, and sheer value for money. We've taken the best in Japanese disc drive technology and backed it with Britain's longest guarantee – an amazing two years. For full details of our extensive range of half-height 5¼″ disc drives together with information on your nearest stockist, 'phone 0737-65080.

## OPUS – BRITAIN'S LEADERS IN DISC DRIVE INNOVATION

To: Opus Supplies Limited, 55 Ormside Way, Holmethorpe Industrial Estate, Redhill, Surrey.
Please rush me the following: (PRICES INCLUDE VAT AND CARRIAGE)

__________ Challenger Unit(s) £249.95 each

__________ RAM DISC upgrade(s) to 512K at £49.95 each

I enclose a cheque for £__________ or please debit my credit card account with the amount of £__________

My Access ☐ Barclaycard ☐ no. is: ☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐

NAME __________

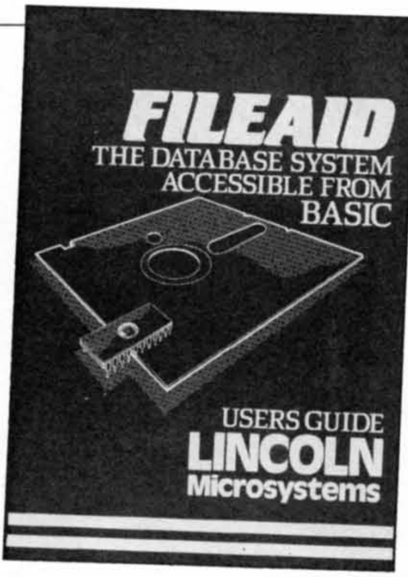
ADDRESS __________

__________

TELEPHONE __________ MU11

Opus.
Opus Supplies Ltd.

# Easy way to store and access data



*Fileaid*
*Lincoln Microsystems*

SOFTWARE packages which describe themselves as databases – though they are often little more than simple filing systems – are usually produced as complete, finished programs which have to be used as provided.

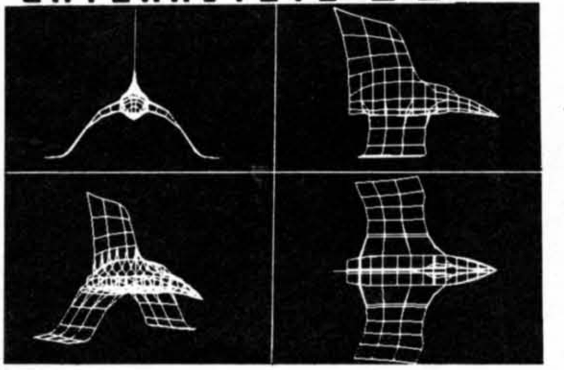
**Fileaid** from Lincoln Microsystems is a database system which is accessible from the user's own Basic program. It provides a range of commands which make it much easier for a programmer to store and access data on disc, so that users can construct their own specialised applications making use of the commands available.

The system is provided on a ROM together with a disc which provides utility programs to format and verify discs, define files, backup and restore files from tape and to display audit information about how data files have been manipulated.

The file definition utility is used when setting up a new file. It asks the user to list the field names and, in the case of string variables, their length. The file name and the number of records are also to be provided and space on the disc is then reserved for the file.

The first field defined acts as the key field and the records are kept in ascending order relative to this. Each record's key field must be unique. When records are to be retrieved, the data will

INTERACTIVE 3D
BBC B
OS 1.2



**INTERACTIVE 3D** is a unique program that actually allows you to create a design directly in a 3D view. And you can zoom, rotate, change viewpoint and perspective **during** the design process to visualise the effects of changes. A novel technique relates the 2D cursor to the position and movement of points on the full perspective view of the wire-frame model. The perspective view can be used on its own or in conjunction with plan, side and end orthographic views (these can also be shown individually).

All design operations occur directly on the screen under cursor control — there is no need to input **any** numerical data (but co-ordinates can be output continuously if required). Full editing facilities allow you to create and delete points and lines, move points with attached lines at any time in any direction, and align points automatically. Symmetrical forms can be created by reflections. Models can be saved to tape/disc and reloaded later to continue the design. Screen dump to an Epson FX80 printer is built in. Altogether, nearly 50 operartions are included.

This is a powerful, high quality software package written by a professional engineer, and made available at a very low price. It is of immense value in **engineering design, graphic arts, technical drawing, visual displays, co-ordinate geometry,** and simply "3D sketching".

£8.95 cassette £12.95 disc (state 40 or 80 track)

PO/cheque to DESIGN DYNAMICS, 8 Meadow Way, Ampthill, Bedford MK45 2QX

DESIGN DYNAMICS

IN BROMLEY

**BROMLEYS FIRST**
**SPECIALIST COMPUTER STORE**

We are official Acorn Dealers with high standards to maintain and take pride in friendly and efficient advice and service.

See our extensive range of printers, monitors, disc drives, software and books.

**Data Store**

**6 Chatterton Road, Bromley, Kent. 460 8991**

be stored in Basic variables of the same name and type as those in the file definition.

The main commands which can be used from Basic allow the programmer to:

- ☐ Read the first or last records in the file.
- ☐ Read the next or previous record.
- ☐ Replace a record that has just been read (to modify a record).
- ☐ Insert, delete and undelete.
- ☐ Read a record with a certain key field.

After every command, Fileaid records a return code in a special Basic variable. Its value gives the user information about how successful the command was. For example, if the command were successfully carried out the return code is 0. If, however, we try to retrieve a record which does not exist then the return code is 21 and so on.

The value of the return code can be examined by the user's program so that processing can be altered, or error messages displayed, as appropriate.

Note that although for each file there is only one field – the key field – which can be used to search for a record, more than one file can be accessed in a program. This can allow the user to set up indexes based on other fields, provided that these are also unique, which can be related back to the main file.

For example, if we were dealing with a personnel file then we could record the data using a person's full name as the key. A second file could be set up using national insurance number as the key and recording the name of the person with that number.

Access to an individual's record is now possible by specifying either name or number as, if the specified data – say number – is not found on the main file, the return code can then be used to switch the search to the other file and pick up the related name which is used to search the first file again.

The system comes with a good user guide and a demonstration Basic program with which to experiment. As the guide suggests, it is well worth printing out a program listing so that you can see how the program makes use of the ROM commands.

I think that this system is a very useful idea which should make life much easier for anyone who has to do a lot of programming involving disc file access.

**Ken Garrett**

# Protect and survive?

*Floppy Wise*
*Software Services*

IMAGINE my surprise when I opened the box containing **Floppy-Wise** by Software Services and found an eprom with a piece of wire soldered between pins 1 and 28. After checking in the hardware guides I concluded that this was the way to get Mitsubishi eproms to work on the BBC Micro. Well done Software Services!

Floppy-Wise contains a number of disc routines that complement both the DFS and chips such as Disc Doctor. In addition to the usual FORMAT and VERIFY commands there are selective and renaming disc to disc copiers for unprotected files.

*FCOMPARE checks whether a Basic program or datafile has been correctly copied on to disc. A useful little routine – CONVERT – changes a 40 track disc to 80 tracks, keeping the programs on the disc at the same time. Two commands – ASCII and DERRORS – display data on hex values for Ascii codes and on the disc error numbers.

One of the most useful disc utilities is one which tells you what space is left on a disc and whether it is in one contiguous block or in little bits requiring compacting. *DSPACE provides a simple display with exactly that information for any drive.

As I tend to forget to save programs regularly during development I occasionally find I have lost them due to some silly error on my part. Now with *AUTOSAVE Floppy-Wise saves a copy of my Basic program to disc every four minutes. This is an extremely useful utility to have.

It is with regard to protected discs that Floppy-Wise really comes into its own. Two commands – *PREPARE and *PROTECT – prepare a disc for protection, and protect it after all the files have been saved on it.

But the "pièce de resistance" is *CLONE. This routine provides backup copies of protected discs quickly and simply.

I have been using this for several weeks and have yet to find a disc that it has not copied, including three that had proved uncopiable with any previous routine.

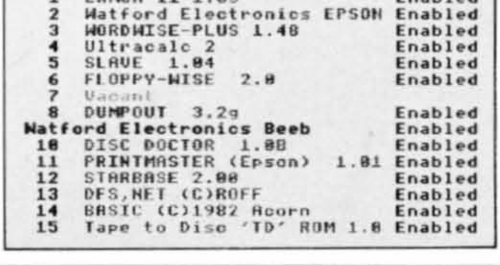
I cannot stress strongly enough that to copy for any purpose other than personal backup is illegal, a point clearly made in the Floppy-Wise handbook. In order to use *CLONE all that is required is two disc drives – it will cope with swapping discs in a single drive – and two discs, the source disc being write protected.

The destination disc can be any format. After entering the command, sit back and watch as two passes are made transferring formatting and data to the new disc, a full 40 track disc taking under four minutes.

Finally *ROMS provides a very useful list of ROMs resident in your micro, indicating whether they are enabled or disabled (see Figure I). *ROM ROM number E/D enables or disables the specified ROM.

Fully Tube compatible, Floppy-Wise is an extremely useful ROM with its price in the middle of the range for 8k ROMs. But it might have benefitted from an expanded handbook that explains each routine more fully. I can thoroughly recommend Floppy-Wise to any serious disc user.

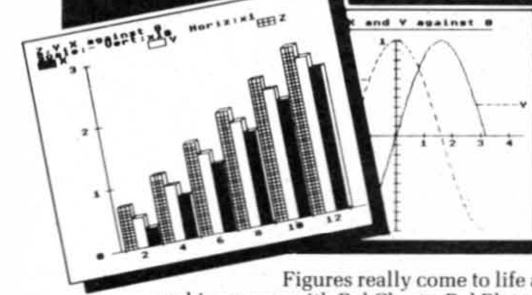
**Ian Whitmore**



```
              ROM FILING SYSTEM
   0   TOOLKIT 1.25                   Enabled
   1   EXMON II 1.03                  Enabled
   2   Watford Electronics EPSON Enabled
   3   WORDWISE-PLUS 1.48             Enabled
   4   Ultracalc 2                    Enabled
   5   SLAVE  1.04                    Enabled
   6   FLOPPY-WISE  2.0               Enabled
   7   Vacant
   8   DUMPOUT  3.2g                  Enabled
Watford Electronics Beeb              Enabled
  10   DISC DOCTOR  1.0B              Enabled
  11   PRINTMASTER (Epson)  1.01 Enabled
  12   STARBASE 2.00                  Enabled
  13   DFS,NET (C)ROFF                Enabled
  14   BASIC (C)1982 Acorn            Enabled
  15   Tape to Disc 'TD' ROM 1.0 Enabled
```

*Figure I*

# *We can easily picture your vital statistics...*



***Bel Plot*** Choose Fields/Variables for Vertical and Horizontal Axes. Graphs may be overlaid and there is a Least Squares Curve Fitting routine which gives the derived equation, plots it and shows the data points. Equations in Y and X and also Parametrics may be entered and plotted.

Figures really come to life and start making sense with Bel Charts, Bel Plot and, when supplied together, Bel Graph.

Developed for the amateur and professional alike it's the Graphics Software that's powerful, sophisticated yet menu driven, easy to use with extensive use of function keys and is available in tape or disc form.

Just look at the features common to Bel Charts and Bel Plot:

- Automatic drawing and scaling of axes with optional self labelling facilities, titles, etc. (Coarse/Fine Cursor movement).
- Data entry from file or keyboard into 4 fields. (Range, All or Select Records on Disc).
- Comprehensive edit facilities – move, delete, change, swap, integer, invert, average, scale, default values.
- Sort (ascend/descend).
- Screen dump – access own rom, append own or supplied (for Epson).
- Save/load screens.
- Two colour mode – change colours if required.
- Test familiarisation files and full instruction manual.

***Bel Charts*** Up to 3 fields may be plotted against the 4th as Line Graphs, Bar Charts, Vertical Bar Chart or Histograms.

Charts may be plain or 3D and up to 60 Bars can be displayed (20 intervals).

Pie Charts may show the 4 Fields or have up to 10 segments using a special routine.

Bar and Pie Charts can be displayed together.

Plain, solid, line and striped shading.

Negative numbers catered for.

## *...while you draw on our dream of a disc data base*

***Bel Base 2*** With Bel Base 2 the ultimate data base for the disc user has arrived. With these fantastic features you're set up for almost anything.

- 20 Fields of up to 60 characters each and up to 2400 Records/File. Fields can be alpha, numeric or date in type.
- Menu driven and easily used in both single and multi disc drive systems.
- Dual drive users may have Extension Files which allow data files to occupy 2 disc sides!
- Global and Selective Field/Record Edit – Word Processor style.
- Default Values for data.
- Calculations and re-calculate option.
- Configuration allows easy selection of drives, filenames, etc.
- Fast Sort (Ascend/Descend) on up to 3 Fields at a time.
- Search on up to 3 Fields at a time using <, >, <>, <=, >=, =, "Includes", AND, OR.
- Report Generator, Mail Merge, Form Design (in MODE O), Label Printing, other special prints/displays. Counter for numbering documents, etc.
- Create sub-files, alter file structure, input and output from/to word processor file.

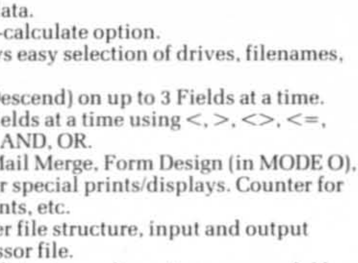
Start to make the data at your fingertips more useful by sending off this coupon, with your remittance today or, if you want to save time, 'phone us through your credit card no.

## Bel Charts, Bel Plot, Bel Graph and Bel Base 2 from Bel Tech

**Innovations in sophisticated software.**

| ORDER FORM | Tape | Qty | Disc | Qty | TOTAL |
|---|---|---|---|---|---|
| BEL BASE 2 | N/A | | 27.00 | | |
| BEL CHARTS | 16.00 | | 17.00 | | |
| BEL PLOT | 16.00 | | 17.00 | | |
| BEL GRAPH (Plot & Charts) | 25.00 | | 27.00 | | |
| BASE 2 & CHARTS | N/A | | 42.00 | | |
| BASE 2 & PLOT | N/A | | 42.00 | | |
| BASE 2 & GRAPH | N/A | | 52.00 | | |
| Other Programs | | | | | |
| BEL BASE (1) | 16.00 | | 18.00 | | |
| BEL GEN Genealogy | 15.00 | | 23.00 | | |
| MAILSHOT | 11.50 | | 13.50 | | |
| TOTAL inc. P&P £ | | | | | |

**BEL TECH Limited,**
College House, St. Leonard's Close, Bridgnorth
Shropshire WV16 4EW. Tel: 07462 5420 (24 hrs).



**BEL BASE 2 and BEL GRAPH FILES CAN BE ACCESSED BY EITHER PROGRAM!**

**SAVE MONEY BY BUYING THE COMPLETE PACKAGE!**

NAME __________

ADDRESS __________ **MU 1**

COMPUTER TYPE __________ MODEL __________

DISC (if applicable) __________

CREDIT CARD No. PAYMENT BY CHEQUE, P.O., VISA, ACCESS ☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐

Please Complete and Return to: BEL TECH Limited, College House, St Leonard's Close, Bridgnorth, Shropshire WV16 4EW. **Tel: 07462 5420 (24 hrs).**

# Well, to tell the truth...

## RORY McCLOY reports on the Biogram lie detector

BIOGRAM is a galvanic skin response detector – a lie detector to you and me – which can also help you relax using biofeedback.

This well made package from Synergy Software consists of a small battery driven sensor unit (battery included) which plugs into the BBC Micro's user port, and two small electrodes with Velcro straps to attach to the fingers of the person under test.

The device comes with a comprehensive software package and a 24 page manual which is easy to follow and contains information appropriate to both novice and more professional users.

The programs are written in Basic and employ Mode 1 and Mode 4 graphics, yet their speed of screen display is adequate.

I had the Biogram up and running within minutes once I had taken the screws out of the D-plug for the user port. The socket for this port lies a short way inside the plastic casing on my BBC Micro and the two round-headed screws prevented the pins in the plug from engaging properly.

I wanted the sensor box, with its sensitivity control and on/off switch, to sit beside the micro and have the subject of the test sitting nearby.

Unfortunately the wires from the control box to the electrodes were too short and the box had to sit on the subject's lap if the arms were to be in a relaxed position.

I was able to adjust the sensitivity control so that the electrodes worked on all the people I tested, but for more serious researchers Biogram II, at £10 more, offers a 3-way sensitivity switch.

The electrodes are fully optically isolated from the micro, which is important for electrical safety since micro-shock (meaning a small but potentially serious DC voltage) is a theoretical possibility if you are going to wire yourself to any electrical device run on mains electricity.

The disc-based software I tested was menu driven with options for:

1. Relaxogram
2. Lie Detector
3. Phobia Reducer
4. Text Builder

There are four relaxation training programs, three of which combine a visual display – of analogue scale with continuous screen plot of changing skin response, each colour coded for degree of relaxation – and a range of sound tones.

The scales and plots are fine but the sound/envelope combinations, with high pitched for tense and low pitched for relaxed, are rather harsh and tend to warble with varying skin responses.

After a while the sound irritated me and did little to help my biofeedback. I was grateful there was a sound-off option.

My 11-year-old son tested the Relaxogram and peace reigned for an hour. When I went to see how he was getting on I found him slumped in front of the computer. A half-open eye indicated he was still with us.

He had managed to reach the light-green level of relaxation second only to the white band, which I can only assume measures grade IV coma.

The fourth Relaxogram option provides a digital display and scores the time taken to relax. This would be useful for class work to compare subjects or performances on separate occasions.

There are surely enough health and fitness freaks around, paying out good money for Yoga and relaxation classes,

→

*The Biogram can also help you relax*

*From Page 51*

as well as professional occupational therapists, who would find this suite of programs excellent value.

The Lie Detector option requires more attention if meaningful results are to be obtained. The manual offers clear and practical advice on the format which verbal interrogations or screen-based questions should take and an indication of how to interpret results as valid or spurious.

Plots of skin response can be saved for future review. Screen based questions – "text frames" – are created using menu option 4. The Lie Detector programs will probably find most use in colleges and psychology units, and this module will do the job of equipment costing many times more – an important bonus in these days of education and research cuts.

The Phobia Reducer can be used in two ways – Wordtest and Reducer. Wordtest displays a selection of words on the screen for about 15 seconds each, either randomised from up to 100 pre-programmed words or from up to 40 frames of user-defined phrases created with the Text Builder.

The software comes with an interesting selection of 100 words which can be easily modified to suit the user. The skin response is plotted following each word test and the results can be very revealing.

> **‘Results can be very revealing . . .’**

When my two sons tried it the 11-year-old reacted positively to SKID, CUT, BUST and the 13-year-old to WORK, DENTIST, QUICKSAND, GIRLFRIEND and BUST (a different type I suspect).

I felt the Biogram's powers of detection were vindicated when my wife had an unequivocal response to CAR – hers had broken down three times in as many weeks. Lack of space prevents me from listing my own hangups.

The section of the manual dealing with the second Phobia option, Reducer, explains how to put spiders in glass jars (but not how to catch them) to show your unsuspecting test subject. The advice on how this can be done without inducing apoplexy is sensible and couched with warnings, since tampering with peoples' phobias could cause problems.

Biogram is a professional package and good value for money providing you have a use in mind. It will only be of passing interest if bought as a game.

Synergy Software tell me they are planning to alter the length of the electrode wires and are finding out if anyone else has had problems with the screws in the plug socket.

TOP QUALITY DISCS AT COMPETITIVE PRICES

3½ 5¼ 5¼

**3½" Nashua** Microdiscs

| | Per Box of 10 | + 10 Boxes |
|---|---|---|
| SS/DD 135tpi | £28.00 | £27.00 |
| DD/DD 135tpi | 37.00 | 36.00 |

**Authorised Nashua Distributor**

**5¼" Nashua** Floppy Discs
5 Year Guarantee

| | Per Box of 10 | +10 Boxes |
|---|---|---|
| SS/DD 48tpi | £11.00 | £10.00 |
| DS/DD 48tpi | 15.00 | 14.00 |
| SS/DD 96tpi | 16.00 | 15.00 |
| DS/DD 96tpi | 18.00 | 17.00 |
| 1.6M 96tpi | 40.00 | 38.00 |

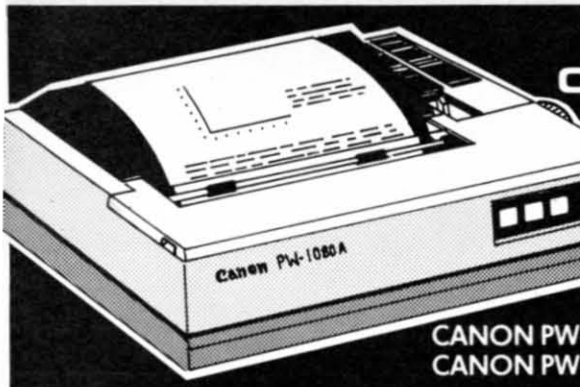
**5¼" Own Label**
Floppy Discs in Library Case
5 Year Guarantee

| | Per Box of 10 | +10 Boxes |
|---|---|---|
| SS/DD 48tpi | £10.00 | £ 9.00 |
| DS/DD 48tpi | 13.00 | 12.00 |
| DS/DD 96tpi | 16.00 | 15.00 |

Micro Resources Limited
Southfield House, 11 Liverpool Gardens
Worthing, Sussex BN11 1RY
Worthing (0903) 213174

VISA

Special prices for Software Houses
from 75p per disc in bulk packed form
Send payment or phone to use credit card
Large quantity and Education Discounts given
All prices include delivery, please add VAT at 15%
Trade enquiries welcome, send for dealer price list



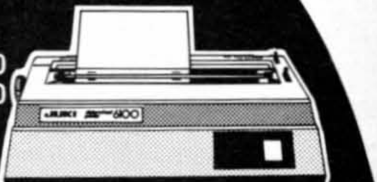
# CANON PW-1080A

**OR KAGA TAXAN KP810**
**NEAR LETTER QUALITY PRINTER**

NLQ Mode 23 × 18 Matrix: 27 cps
Draft Mode 11 × 9 Matrix: 160 cps
Full range of Epson FX 80 Print Codes
Friction & Tractor Feed
Centronics Interface Standard
CANON PW-1156A Available
(Accepts 17" Paper)

CANON PW-1080A £265.22 + VAT = £305.00
CANON PW-1156A £360.00 + VAT = £414.00

**See below for Printerpack prices**



**Low Prices**

## C.J.E. MICRO'S BBC PRINTERPACKS

For Star, Canon & Juki Printers include:
1. The Printer
2. Next Working Day Delivery
3. Cable to the BBC 1.25 Metres
4. Screen Dump Program (M/C Source)
5. Text Dump Program
6. Function Key set up Program.
7. Function Key Label Printing Program.
8. VIEW Printer Driver
9. 100 Sheets of Paper
10. Mains Plug with 3 Amp Fuse
11. Booklet giving details of using the printer with a BBC
12. Character Defining Program for Downloadable-character-set (draft mode)

| | |
|---|---|
| **CANON PW-1080A** | **BBC PRINTER PACK £330 inc VAT** |
| **CANON PW-1156A** | **BBC PRINTER PACK £439 inc VAT** |
| **JUKI 6100** | **BBC PRINTER PACK £400 inc VAT** |
| **STAR SG10** | **BBC PRINTER PACK £295 inc VAT** |

OFFICIAL
ACORN
APPROVED
DEALER

## JUKI 6100

One Year Warranty
20 CPS: BiDirectional & Logic Seeking
10, 12, 15 & Proportional Spacing
Wordstar Compatible
2K Buffer; 13 Inch Platen
Underline; Backspace + Lots more
Centronics Interface Standard
RS 232 Interface £54.00 + VAT Extra
Tractor Feed £119 + VAT Extra
Single Sheet Feeder £199 + VAT Extra

**JUKI 6100 £330.43 + VAT = £380.00**

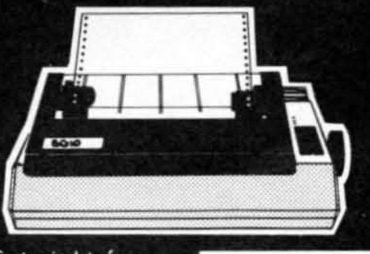
**See left for Printerpack prices**

RING FOR SAMPLE PRINTOUT,
FULL SPECIFICATIONS
& LATEST PRICES

**Top Service**

# STAR SG10

**NEAR LETTER QUALITY**



NLQ Mode 17 × 11 Matrix
True Descenders 9 × 9 Matrix
120 CPS Bidirectional & Logic Seeking
40, 48, 68, 80, 96, 136 cpl
Italics, Emphasized, Double strike
Super & Sub Scripts
Downloadable Character Set
Hi-Resolution & Block Graphics
Friction or Tractor Feed
10" Carriage
**See above for Printerpack prices**

Centronics Interface
Standard RS232 Int.
£58.00 + Vat Extra

**STAR SG10**
**£270.00**
**inc. VAT**

**WIN A PORSCHE 924S when you buy a STAR SG10 from CJE**

Written details on request.

## FONTAID

NLQ Designer for Canon and Taxan Kaga NLQ Printers.

Design your own NLQ fonts or 'download' one of our 20+ predefined fonts. The FONTAID disk includes the following type styles:
Square, Outline, Gothic, Computer Type Style, Bold, Shadow, and Broadway.

Additional Disk 'A' includes:
Greek/Maths, Script, Proportional Spacing, Plain, Handwriting and 2 styles of (Elite, Condensed, Super Condensed).

FONTAID requires 6264 RAM Chip in printer.

| | |
|---|---|
| **FONTAID (BBC)** | **£30.00** |
| **FONTAID (BBC) with 6264 RAM** | **£36.00** |
| **FONTAID Additional Disk 'A'** | **£15.00** |

**ROMS of individual fonts are available and can be used with any computer.**

| | |
|---|---|
| **FONT ROMS** | **£18.00 each** |
| **P & P on FONTAID** | **£1.00** |

Please phone for FONTAID leaflet and demonstration print out.

Coming Soon MULIT-FONT NLQ printing for Epson MX/RX/FX/LX and Epson compatibles.
Design your own font or use supplied predefined font.

Please phone for latest details.

**EXPORT ORDERS WELCOME**
**VAT INCLUDED WHERE APPLICABLE**
**PHONE/CREDIT CARD ORDERS WELCOME**
Postage 50p per order or as stated
Next day Delivery for Printers/Disk Drives £8.00
**FULL RANGE OF CONNECTORS & CABLES AVAILABLE**
**PRICE LIST ON REQUEST**

CJE micros

Dept **MU11**, 78 Brighton Road, Worthing
W. Sussex BN11 2EN (0903) 213900

# RINT QUALITY

# MICROWORLD

## COMPUTER GROUP

**star**

*The Power Behind the Printed Word*

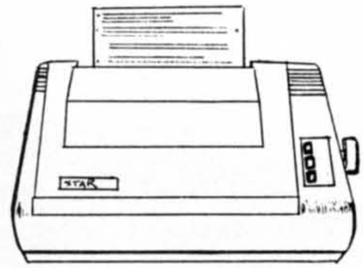
## NEW SG-10 NLQ

**Only**
**£270**
inclusive
of VAT, BBC cable,
box of paper (2000 sheet)
and Printmaster ROM worth £61.00

**VERY VERSATILE**

**Features**

1) 120cps — bidirectional logic seeking
2) Near letter quality mode
3) Inexpensive ribbons
4) Epson and IBM compatible
5) Easily accessible dip-switches
6) Friction and Tractor feeds
7) Standard parallel Interface-free BBC cable
8) 12 months guarantee and our 7 day Money Back Guarantee.



**SG-10 NLQ**

### COMPUTERS

| | |
|---|---|
| Acorn Electron ALA01 with 5 Pack | £119.00 |
| Acorn Electron YTV Starter Pack | £139.00 |
| BBC Model B | £339.00 |
| BBC Model B with DFS | £399.00 |
| BBC Model B with DFS and NFS | £465.00 |
| BBC B PLUS (64K RAM) | £469.00 |
| (Free Cumana CSXL100 with B Plus) | |
| Z80 Second Processor with software | £379.00 |
| 6502 Second Processor | £190.00 |
| 32016 Second Processor (32 bit) | £1,099.00 |
| Winchester 10MB with Level III | £1,699.00 |
| Winchester 30MB with Level III | £2,499.00 |
| Econet Starter Pack (Clock + 2 terms) | £99.95 |

### DISK DRIVES

| | |
|---|---|
| Cumana CSXM100 40T, Single, no psu | £79.95 |
| Cumana CSX100 40T, single, no psu | £89.95 |
| Cumana CSX200 80T, single, no psu | £139.95 |
| Cumana CSX400 80T, single, no psu | £109.95 |
| Cumana CSL100 40T, single, with psu | £109.95 |
| Cumana CS100M40T, single with psu | £109.95 |
| Cumana CS400 80T, single, with psu | £129.95 |
| Cumana CD200 40T, dual, with psu | £239.00 |
| Cumana CD400/S 80T, dual, with psu | £279.00 |
| Cumana CD800/S 80T, dual, with psu | £249.95 |
| Disk Interface kit with DNFS Rom | £69.00 |
| Disk Interface with DNFS Rom fitted | £89.00 |
| Torch Z80 Disk Pack | £699.00 |

All Cumana Drives come with cables, manuals formatter disc

### ROMs & SUNDRIES

| | |
|---|---|
| AMX Mouse superb plus software | £75.95 |
| Wordwise ROM | £39.95 |
| Wordwise plus ROM | £52.00 |
| View ROM | £58.00 |
| View Sheet ROM | £52.00 |
| Disc Doctor ROM | £33.95 |

BRANCHES THROUGHOUT SCOTLAND

ABERDEEN
GLASGOW
EDINBURGH

## VERY LIMITED OFFER
## DFS KIT

**A complete kit of parts with DNFS ROM — Mail Order Only**

**£69.00 incl. VAT**

### EDUCATIONAL SPECIALIST

Microworld are Scotland's sole Scottish based distributor with vast experience of Econet and can offer installation, service, advice and supply throughout the U.K. Our London office is now open to service the entire country. Please call for our latest Educational Prices or phone for our list of dealers nationwide.

**★★ Stop Press ★★**

Acorn 30 MB and 10 MB Winchester's for Level III Econet, ex. stock.

### SPECIAL PRINTER OFFERS

**JUKI 6100** — Superb 18 c.p.s. Daisywheel Printer with 10, 12, 15 pitch and proportional spacing. Complete with free BBC cable
Only **£339** incl VAT
(Sheet Feeder £199)

**Canon PW 1080A/NLQ** — Superb near letter quality printer with draft speed of 160 c.p.s. and NLQ speed of 27 c.p.s. Fully Epson Software compatible and ideal for use with most computers: comes complete with free BBC cable.
Only **£289** incl. VAT
(Serial Interface extra £85)

### BRANCH NETWORK THROUGHOUT THE UK

**Glasgow**
11 Bath Street
Glasgow 041 332 1116

415/419 Blythswood Court
Anderston Cross Centre
Glasgow 041 226 3011

**Edinburgh**
12 Leven Street
Tollcross
Edinburgh 031 228 1111

4 St. Andrew Square
Edinburgh 031 557 2087

**Central Despatch Dept.**
Constable House
Hopetoun Street
Edinburgh EH7 4NF
031 556 0191 x240

**Aberdeen**
77 Holburn Street
Aberdeen
0224 571735

**London**
Park House
140 Battersea Park Road
London SW11 4NB
01 627 4840

# MICROWORLD

## LONDON

## CALL 01-627-4840

24
Hours
Service

**Cumana**
**CSXL 100**
**Disk Drive**
**& DFS Kit**
**only**
**£139.95**
**incl. VAT & Carriage**

**Cumana CS400**
**Disk Drive**
**& DFS kit**
**£199.95**
**incl. VAT & Carriage**

**Cumana CD800/S**
**40/80 track switched**
**Dual Drive was £349.95**
**Sale price £249.95!**
**incl. VAT**
**or with DFS**
**£319.95 incl. VAT**

## THIS MONTH'S SPECIAL OFFERS

**Acorn Electron**
**Microcomputer**
**with Plus 1 adaptor**
**Joystick and five**
**software packs,**
**were £201.75**
**now only £129.95**
**incl. VAT**

**Cumana QFS**

**Double Density Disc**
**Interface Kit**

**Only £59.95 incl.**

**(Compatible with Acorn DFS)**

**Torch Z80 Disc Drive**

**comprising dual disc drive**
**(800K) and Z80 second processor**
**with £1,000 worth of free**
**software and free DFS kit**

**worth £910.00**

**Only £589.00**
**incl. VAT and Carriage**

## HOW TO ORDER

Orders by post welcomed: please mail coupon with payment.
Telephone orders welcome:
call 01-627 4840(London) or 031-228 1111 (Edinburgh).
We also welcome Government and Educational orders.
All products suppled include our own 12 months guarantee backed by our own service centre staffed by fully qualified engineers.
Order with confidence, 7 days money back guarantee.
All charges include VAT and carriage charges by courier. Dealer enquiries and personal callers welcome. All offers stated here are available through any of Microworld's 50 dealers nationwide.
The right is reserved to alter prices without prior notice.

E.&O.E.

## MAIL ORDER

**To: Microworld Distribution, Dept. AU, Park House, 140 Battersea Park Road, London SW11**
**01-627 4840**

**Please send me** ______________________________

______________________________

______________________________

☐ **I enclose a cheque for £..........................payable to Microworld Computer Systems Ltd.**

☐ **Please debit my Access/Visa/American Express Account**

**No**..................................................**Signed**..................................................

**Name**______________________ **Address**______________________

______________________________

# The Editor's Editor

## MIKE MAHON concludes his series on Basic utilities with a look at a newcomer from Acornsoft

**A NUMBER of 16k utility chips have recently appeared which possess Basic toolkit and editing commands. Most are a Jack of all trades, having Basic, machine code and filing system utilities.**

The target of this month's review however, concentrates solely on one aspect – assisting the user to alter and analyse Basic programs.

The Basic Editor 16k ROM version 1.32 is Acornsoft's first utility chip, and as with most other products from this supplier, it is well packaged, well thought out and bug free. Acornsoft's confidence in the latter is expressed in their use of a 16k ROM rather than an eprom.

The package contained the ROM, stick-on label, a function key strip and an A5 format 41 page manual. The manual is clear, easy to use and has many examples and an index.

The Basic Editor is really a language chip acting as a word processor for editing Basic programs. The language command screen is entered with *BE and resembles a view-style screen.

Typing HELP displays the 30 commands available – see Figure I – most of which may be reduced to a single letter. Obviously essential features such as LOAD, SAVE, NEW and OLD are present here.

Operating system star commands may also be used, and exiting to Basic is very simple. The Escape key is used Wordwise fashion to toggle between command mode and edit mode.

If the program is not too long – in excess of around 5½k – I find Mode 0 the most useful for a colour monitor as it gives an 80 column display with a very legible white on blue background.

Editing can be done in Modes 0, 1, 3, 4, 6 and 7, selected by MODE from the command screen and a variety of BACKground or FOREground colours may be chosen in modes other than 7.

The edit screen can also be entered by TOP, END or a line number followed by a Return. A program may be loaded within or before entering the editor or may be created there.

In editing mode the cursor keys in conjunction with Shift or Ctrl are used to scroll or jump through the program forwards or backwards and along the line in true word processing style.

Jumping to the start, TOP or END of the program requires the appropriate command or function key. Edit mode also enables many of the function keys to duplicate commands, as shown in Figure II, although additional features are also present there.

Another word processor-like feature is the use of Tab to move in selected increments along the line.

Text, that is program statements, at the cursor position may also be altered by overtyping, added to or deleted – Delete or Shift+Delete – or the case swapped.

In addition, if the blinking of the cursor becomes annoying it may be switched off by depressing the Copy key or quickened by subsequent presses.

Extra blank lines of program ready for text entry are readily created by pressing Return.

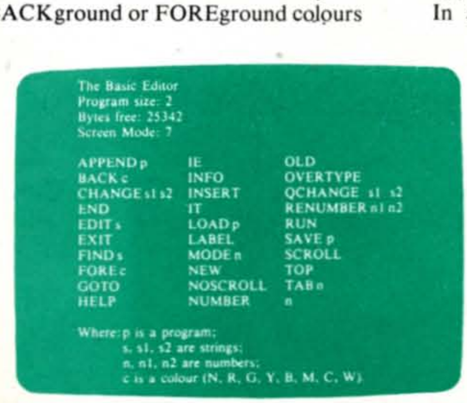
If necessary, the program is automatically renumbered to accommodate the extra lines.

Pressing the Return key is easy to do by accident, and unfortunately there is no similar single command to remove the lines unless UNDOne immediately.

Extra lines can also be added at the top or end of the program respectively with the commands IT or IE or appropriate function keys.

Another editing function which is tedious without a Basic utility aid is joining or separating multistatement lines. The Basic Editor performs this easily by the user locating the cursor over the desired change and pressing the appropriate function keys.

Splitting statements is quite intelligent – that is, the sense is not broken up in the middle – and renumbering is carried out



```
The Basic Editor
Program size: 2
Bytes free: 25342
Screen Mode: 7

APPEND p       IE          OLD
BACK c         INFO        OVERTYPE
CHANGE s1 s2   INSERT      QCHANGE  s1  s2
END            IT          RENUMBER n1 n2
EDIT s         LOAD p      RUN
EXIT           LABEL       SAVE p
FIND s         MODE n      SCROLL
FORE c         NEW         TOP
GOTO           NOSCROLL    TAB n
HELP           NUMBER      n

Where: p is a program;
       s, s1, s2 are strings;
       n, n1, n2 are numbers;
       c is a colour (N, R, G, Y, B, M, C, W).
```

*Figure I: Help screen – available direct commands*

| Key | fkey | Shift+f key | Ctrl+f key |
|---|---|---|---|
| f0 | Execute | New | Mark |
| f1 | Insert/overtype | Old | Goto |
| f2 | Top | Undo | Split statement |
| f3 | End | Swap case | Join statements |
| f4 | Renumber | Extend statement | Repeat |
| f5 | Continue | Mode | Scroll on |
| f6 | Delete to end of line | Label | Scroll off |
| f7 | Top of screen | Number | Background |
| f8 | Insert at end | Insert at top | Foreground |
| f9 | Exit | – | – |

*Figure II: Function key commands – edit mode*

| Command | Action |
|---|---|
| R | Remove line commands and marks. |
| D | Delete statement. |
| DD DD | Delete block. |
| DDE | Delete to end. |
| DDT | Delete to top. |
| M | Move line to mark. |
| ME | Move to end. |
| MT | Move to top. |
| MM MM | Move block to mark. |
| MM MME | Move block to end. |
| MM MMT | Move block to top. |
| A | Mark destination above. |
| B | Mark destination below. |
| C | Copy statement. |
| CE | Copy to end. |
| CT | Copy to top. |
| CC CC | Copy block to mark. |
| CC CCE | Copy block to end. |
| CC CCT | Copy block to top. |
| f0 | Mark for quick find. |

*All the above command letters are entered with the Ctrl key depressed.*

*Figure III: Line and block editing commands*

when required.

Facilities are also available (APPEND) to join two or more Basic programs together without the need for the SPOOL commands and a quick look in the User Guide.

The editor will renumber the new program if necessary, reset to Mode 7 if it is large, or display an error message and restore the original if the new program will not fit into memory.

Full or semi-partial renumbering can also be carried out in edit or command mode.

A prime requirement of any Basic programmer's aid is to locate and/or alter any or all occurrences of particular strings within a program. From the Basic Editor command screen these functions are carried out by EDIT, FIND and (Q)CHANGE. They all work with strings of any type, in quotes, Basic keywords, symbols, numerics and so on.

*EDIT word$* will display the program around each occurrence of *word$* ready for editing. Pressing f5 (CONTINUE) moves on to the next occurrence. *FIND Fred* is similar but simply displays all the lines in which the search string Fred occurs. Unfortunately there is no option to print out the finds.

Finally, *CHANGE Spectrum BBC*, or *QCHANGE Spectrum BBC* will globally or selectively alter occurrences of the string *Spectrum* into the string *BBC*.

To make this Basic editing facility seem even more miraculous, try the Biblical example given in the manual which concerns the strings *water* and *wine*. One limitation, however, with these commands is the lack of a wildcard facility.

When a program is displayed in edit mode it is given as the List 0 option with a space between the line number and text. A mark (.) may be inserted here at one line of text using Ctrl+f0 such that it may be returned to instantly in edit mode with Ctrl+f1 or from command mode with GOTO.

A whole series of line commands – see Figure III – can similarly be placed at the beginning of a line, overwriting the line number, in order to mark lines or blocks of text which are to be deleted, moved or copied within a program.

The options are fairly extensive, as seen from the list in Figure III, and the method is much easier than that used in most other Basic toolkits because the program can be scrolled around in front of your eyes and marked for editing.

An example is shown in Figure IV. To carry out the marked delete, move or copy the user simply presses the EXECUTE key (f0). All marks and line commands may be removed by pressing Ctrl+R, although they are not stored as part of the program and do not need to be removed before running.

```
  100  REM ROMAN NUMERALS
  110  REM Mike Mahon
  120
  130  VDU3:*MOTOR 0
  135  *FX4,1
  140  *KEY10 OLD¦M RUN¦M
  145  *FX11,0
  150. MODE7
  160  ON ERROR RUN
  170  DIM roman$(4,10)
  180  PROCdata
  190  PROCtitle
  200  END
  499
DD     DEFPROCdata
  510  DATA 0,I,II,III,IV,V,VI,VII,VI
       II,IX
  520  DATA 0,X,XX,XXX,XL,L,LX,LXX,LX
       XX,XC
  530  DATA 0,C,CC,CCC,CD,D,DC,DCC,DC
       CC,CM
  540  DATA 0,M,MM,MMM,0,0,0,0,0,0
  550  FOR row%=1 TO 4:FOR col%= 0 TO
       9:READ roman$(row%,col%):NEXT:
       NEXT
DD     ENDPROC
  599
  600  DEFPROCdecinput
  605  okay$="1234567890":maxlen=4
  610  CLS:PROCreturn:PRINT TAB(2,5)"
       Enter Decimal number  ";:PROCc
       heckinput:dec=VAL(string$)
  620  IF dec <1 OR dec>3999 OR dec<>
       INT(dec) THEN PROCinvalid:PROC
       decinput
  630  PROCdecanalyse
  640  PRINT TAB(8,8)"Roman numeral
        ";romnum$
  650  PROCpause:PROCdecinput
  660  ENDPROC
  699
```

*Figure IV: Example edit*

The Basic Editor also has a feature which, some might say, encourages unstructured programming. For example when using GOTO or GOSUB in the early part of a program the destination line numbers may not be known and a label name, beginning with @, may be used instead and subsequently marked on the appropriate line when that stage of a program is reached.

The command NUMBER simply

►

From Page 57

converts these labels to line numbers and LABEL reconverts them back again.

Entering and leaving the Basic Editor is straightforward using *BASIC, EXIT or RUN. The latter is especially useful as it exits the editor, performs OLD and RUNs the program.

If the editor is re-entered – *BE – then the default colours, mode and marks are lost. Further information on colours, searches, Tab values and so on may be gained from INFO, which reveals the type of display shown in Figure V.

The Editor also has a set of 38 enhanced error messages to assist the programmer. Some examples include "Lines too long to be joined", "Destination missing", "Only colours N, R, G, Y, B, M, C, W are valid" and so on.

It is compatible with Basic 1 and 2, and most important, is one of the few Basic utilities to be fully 6502 second processor compatible.

Simplicity and ease of use are the hallmarks of the Basic Editor. It is very intelligent and all its functions are superbly implemented.

It is without doubt the best editing utility currently available for BBC Basic and I cannot see how its style could be beaten in the future.

It has many of the Basic toolkit functions for partial renumbering, moving lines or blocks, inserting, deleting, finding and replacing – both globally and selectively – and a merge function.

```
Scroll on
Overtype mode
White on blue

Program name:   ROMANS
Last search:    numeral

Tab Value:      5     No. of lines: 113
First line:     100   Last line:    2410
Current line:   200   Marked line:  150

Pending commands:
DD 500   DD560
```

*Figure V: A typical INFO screen*

At just around £30 for a 16k chip it therefore represents reasonably good value for money. It is not, however, a complete Basic toolkit in that functions for displaying full memory usage, cross referencing, variable dump, packing, print formatting, verify or repairing bad programs are not included.

Therefore most programmers will require another good Basic utility chip such as Toolkit (Beebugsoft), Caretaker (Computer Concepts), Slave (A & F) or Probe (Altra) to be co-resident, some of which also have their own, though somewhat inferior, Basic editors. We've met most of these in this series.

Even so, despite the latter comment, well done Acornsoft for setting the standard with yet another excellent quality product.

By the way, in addition to describing the standard of this chip, the title of this article is to remind me that now the review is done, HE wants it back. Our editor always had a good eye for a nice bit of software.

DISC DRIVES FOR BBC

| | | |
|---|---|---|
| **D80SMP** | dual drive (2 x 400k) 40/80 switchable double sided + monitor stand + PSU | **£320** (b) |
| **S80SP** | single drive (400k) 40/80 switchable double sided + PSU | **£160** (b) |
| **S80S** | single drive (400k) 40/80 switchable double sided | **£110** (b) |
| **S80FD** | single drive (400k) full height 80 track double sided | **£90** (b) |
| **S80F** | single drive (200k) full height 80 track single sided | **£75** (b) |
| **S40S** | single drive (100k) 40 track single sided | **£100** (b) |
| **D35** | dual 3½" drives (2 x 400k) 80 track double sided | **£200** (b) |
| **S35** | single 3½" drive (400k) 80 track double sided | **£115** (b) |

**ACORN INTERFACE** **£55** (c)
**ACORN DNFS** **£75** (c)
**8271** **£46** (a) **27128** **£4**(a)
**2764** **£2.75** (a) **6264LP** **£5** (a)

Quantity discounts available

NEW

**SINGLE TO DUAL DRIVE CONVERSION SETS**

Allows two single Drives 0 to be automatically configured as DRV0 and DRV1 **£15**(a)
Single/Dual power lead converter **£9**(a)

Carriage charges – (a): £1 (b): £10 (c): £2
All prices include VAT

CD **CARSON DEVELOPMENTS (MU)**
84 Highfield Road, Romford, Essex RM5 3RU
Telephone: 0708 27043

DISKETTES from £10 per pack – excl: VAT. All discs guaranteed and have lifetime warranty.

| | 10 of | 25 of |
|---|---|---|
| 40tk SSSD | **£11.50** | **£27** |
| 40tk SSDD | **£12.65** | **£29** |
| 40tk DSDD | **£15** | **£35** |
| 80tk DSQuad | **£17** | **£41** |

Add £7 for a 50 capacity storage box with smoked perspex lid dividers and non-slip rubber feet.

| | DATALIFE | VEREX |
|---|---|---|
| 40tk SSSD | — | **£12** |
| 40tk SSDD | **£14.25** | **£13** |
| 40tk DSDD | **£18** | **£16** |
| 80tk DSQUad | **£24** | |

| SONY | |
|---|---|
| 3½" SSDD | **£38** |
| 3½" DSDD | **£45** |

Carriage & VAT included. No more to pay

**Are you frustrated by page problems, running two or more DFS's, ROM interaction; require a single and double density sector editor?** The new systems utility rom from **ED-SOFT** is your answer. With **Systems Utility** you can: sector edit Acorn, Opus and UDM – enable/disable multiple roms, even across Breaklist roms – check status of roms, even when disabled – peel and poke memory – display basic variables – automatically run a basic/mc file from disc and leave page at E00 – automatically download cassette software from disc only **£20**(a)

**Replica II – Tape-Disc** utility for Acorn, Opus, UDM **£11** (a)

| | | | | |
|---|---|---|---|---|
| **Case** | – slimline | **£13.80** (c) | full height | **£18.98** (c) |
| **Cable** | –single data | **£6.50** (a) | dual data | **£10.50** (a) |
| | single power | **£3.50** (a) | dual power | **£4.74** (a) |

| | |
|---|---|
| **UDM 100% board** | **£17.50** (a) |
| **UDM DDFS 3.1** | **£80.00** (a) |
| **UDM Rom Ram expansion board** | **£55.00** (b) |
| **UDM 3.1 upgrade** (Return old UDM DFS chip) | **£5.75** (a) |

## ACORN COMPUTER SYSTEMS

BBC Model B.....................................................
BBC Model B + DFS.....................................................£299 (a)
BBC Model B + Econet.....................................................£346 (a)
BBC Model B + Econet + DFS.....................................................£335 (a)
BBC B PLUS.....................................................£399 (a)
BBC B PLUS 128K.....................................................£409 (a)
BBC Dust Cover.....................................................£434 (a)
.....................................................£4 (d)

## UPGRADE KITS

Acorn DFS Kit.............£80 (d) 1.2 OS ROM.............£7.50 (d)
conet Kit...................£55 (d) DNFS ROM.............£17.50 (d)
BASIC II ROM with User Guide.............................£22.50 (d)
**1770 Upgrade Kit for BBC B to B plus**.........................£42.60 (d)
ADFS is Acorn's long awaited double density disc interface system. he hierarchical filing system on the ADFS allows almost unlimited umber of files. Treating a double sided disc drive as one drive llows storage of much larger files and greatly enhances the storage fficiency. Will read 40T discs on 80T drives.
**DFS ROM (for upgraded B's and all B plus)**................£25.20 (d)

## ECONET ACCESSORIES

conet Starter Kit.........£85 (b) Printer Server Rom.......£41 (d)
ile Server Level I.........£75 (d) 10 Station Lead set.........£26 (c)
ile Server Level II......£210 (d) Adv. Econet User Guide.£10 (d)

## ACORN BITSTICK

The renowned 'BITSTICK' graphic CAD package. Using the on-screen menu and colour pallette, it can draw freehand as well as lines and shapes with great accuracy. Any part of a drawing may be magnified many times, and up to 48 drawings may be saved on a disc. In total, a friendly yet sophisticated CAD system offering tremendous value.

**BITSTICK I**
**ROBOCOM BITSTICK II:** This bitstick comes with Bitstick I software upgraded to allow for auto dimensioning, scaling £310 (a)
**ACORN's multiplotter driver** for Bitstick graphics £795 (a)
(All popular plotters included) £79 (c)
Epson FX80 screen dump routine for Bit Stick £35 (d)

## ACORN WINCHESTER DRIVES

Acorn Hard Discs are now available in 10 and 30 Mbyte versions. The drive plugs into the 1 MHz bus. The ADFS filing system with its hierarchical filing structure provides excellent file management facilities. Data transfer rate of 1Mbit/sec and average seek time of 85 ms provides the user very fast access to very large amounts of data. File Server Level III can be installed on the Hard Disc before delivery.

**10 Mbyte Winchester Drive** £1299 (a)
**30 Mbyte Winchester Drive** £1999 (a)
Add £200 to the cost if File Server Level III is to be installed.

## ACORN 2nd PROCESSORS

**The Z80 2nd Processor** converts your BBC into a CP/M business computer. Complete with comprehensive free software. £348 (a)

**The 6502 2nd Processor** provides both an increase in speed and memory. £175 (a)

## ACORN P-SYSTEM

The long-awaited-for portable operating system has arrived. Intended for use with the 6502 Second processor, this portable operating system is a complete implementation and comes complete with a Filer, Editor, and compilers for two languages, USCD PASCAL and FORTRAN-77. Widely used in universities and colleges, as well as being popular with business software authors, P-System is user-friendly, offering ease of program development as well as portability.

**P-System** £263 (b)

## TECHNOLINE

**TECHNO-LINE**
**IS NOW**
**ON-LINE**
**24 HOURS**
**Tel: 01-450 9764**

**TECHNOLINE offers you 24 hour, 7 days a week ordering/information**

- ***New Products *Comment Box**
- ***Technical Pages *Comments on Stock and availability of Products**
- ***Placing of Orders and many others....**

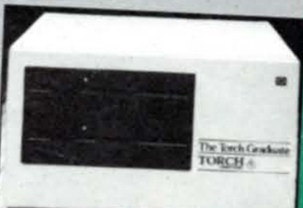
**Techno-Line 01-450 9764**
**24 hour, 7 days a week.**

Technical Information:
1200/75 Baud. Standard Viewdata/Prestel Protocols.
**Please note that a 'Prestel' type terminal must be used.**

## EPROMs/RAMS

**2764-25......£2.40 (d) 27128-25.....£3.20 (d)**
**6264LP-15..£4.50 (d)**

## TORCH PRODUCTS



**GRADUATE:** The ultimate upgrade — converts your BBC into a powerful 16 Bit business computer and makes it disc and hardware compatible with the IBM PC. With 256K RAM and dual drives, it simply connects through the 1 MHz bus. (The disc drives can be used in both BBC and IBM mode, without requiring a disc interface.) The top-of-the-range Model G800/2 comes complete with the free Xchange range of software, and includes a full feature word processor, a financial package — planner, a database and a business graphics all linkable.

(This highly acclaimed software is now available for the IBM PC at a cost of over £400!)

**Graduate G800/2**....................£845 (a)
(Offer valid for limited period only).

**Z80 Card ZEP100 with PERFECT Software Packages + Z80 Basic**....................£275 (a)
**Z80 Disc Pack ZDP240 with software as above**...............£550 (a)
**20Mb Hard Disc + 1 × 400K Floppy Drive**.....£1.950 (a)
**Unicorn 68000, Unix OS/Z80B/512K, 20MB Hard Disc, 400K Floppy**.........................................£3495 (a)

## MULTI-FORM Z80 2nd PROCESSOR

This is a unique Z80 2nd processor running CP/M and allowing use of the massive range of CP/M software. What makes this unit rather special, is that it can be used with software from other CP/M computers, without the user needing specially configured software for the BBC. As supplied, the unit will read many formats and it is possible to configure the unit for virtually any other CP/M machine. Please contact us for further information.

**Multi-form Z80 2nd Processor** £325 (a)

## ACORN MUSIC 500

Convert your BBC micro into a sophisticated music composition aid and sound effects generator. Custom made software will provide you with the flexibility to compose, experiment, perform and teach music. Stereo output can be connected to a sound system including your home stereo unit. Full specification on request.

**Music 500** £174 (a)

## SYMPHONY KEYBOARD

**SYMPHONY KEYBOARD FROM ATPL** — a professional 4 octave keyboard with sophisticated controlled software. Its multitude of facilities include simulation of musical instruments, sound effects, octave shift, pitch bend etc, etc. £108 (a)
**Synth-500 disc** allows its use with the Acorn Music 500 £10 (d)

# TECHNOMATIC

**01-208 1177**

**BBC Computer & Econet Referral Centre**

**MAIL ORDER**
17 Burnley Road
London NW10 1ED

**RETAIL SHOPS**
15 Burnley Road
London NW10 1ED
Tel: 01-208 1177
(close to Dollis Hill ⊖)

**West End Branch**
305 Edgware Road
London W2
Tel: 01-723 0233
(near Edgware Road ⊖)

**TECHNOLINE**
24 hour Viewdata Service 01-450 9764

Orders welcome from government depts & educational establishments.

**All prices ex VAT**

Please add carriage
(a) £8 (Datapost)
(b) £2.50
(c) £1.50
(d) £1.00.

## PRINTERS

**ALL PRINTERS HAVE A 12 MONTH GUARANTEE**

**EPSON DOT MATRIX PRINTERS:** EPSON — the high quality range of dot-matrix printers that set the standard in the industry. A wide range of interfaces ensure that these top-of-the-range printers can be used with most computers.

RX 80T + £210 (a) RX 100 + £345 (a)
FX80 + £315 (a) FX100 + £430 (a)

**Epson LX-80 NLQ:** A new low-cost high performance dot matrix printer from Epson. Its many features include Near Leter Quality, Draft mode, programmable characters, a variety of print styles, graphics etc. Supplied with friction feed.

LX-80 £219 (a) Optional Tractor Feed £20 (c)

**Epson JX80 Colour**A full colour dot matrix printer with colour text and graphics as well as many advanced printer features.

JX80 Colour £475 (a)

**KAGA NLQ PRINTERS**
A top quality yet very competitively priced printer with a Near Letter Quality mode. Includes all the features of Epson FX and uses the same control codes. Extra socket provided on the pcb for installing either 8K RAM or 8K EPROM for custom made font.

KP810 (80 col) £235 (a) KP910 (156 col) £339 (a)

**SEIKOSHA SP-10000**
A low cost attractively packaged printer includes many novel features including NEAR LETTER QUALITY mode and automatic single sheet loading. Variety of fonts, 100 cps, friction as standard. Tractor optional.
**Seikosha SP-1000** £189 (b)

## BUFFALO 32K Buffer for EPSON PRINTERS

This compact 32K buffer can be fitted internally on any EPSON printer within a few minutes. It does not require external power or any modification to the printer. It will hold about 15 A4 pages of text freeing your computer for other jobs in a fraction of the time it would normally have to wait for the printer to finish all that printing. Supplied with full fitting instructions.
**Buffalo 32K Buffer** £75 (d)

## DAISY WHEEL

**BROTHER HR15:** * 14 cps * 3K Buffer * Two colour printing * Proportional spacing * Underline * Bold * Shadow print * Super/Sub script + many other features.

BROTHER HR15 £310 (a)

**JUKI 6100:** * 15 cps * 2K Buffer * Switchable 10/12/15 cpi * Proportional printing * Linear Motor for max reliability.

JUKI 6100 £299 (a)

## PERIPHERAL & COMPUTER SHARERS

We now offer an extended range of peripheral sharers to allow the user to switch between computers, printers and modems. High quality switching mechanisms housed in fully shielded metal cases ensure reliability. No external power input required.

All lines on the sharers are fully switched (36 on parallel and 25 on serial)

| | Parallel | Serial |
|---|---|---|
| 3 Computers to a Printer | 36V36-3 £69 (c) | 25V25-3 £64 (c) |
| 4 Computers to a Printer | 36V36-4 £85 (c) | 25V25-4 £74 (c) |
| 2 Computers/2 Printers x-over | 36V36-X £69 (c) | 25V25-X £69 (c) |
| BBC Cable Set 3 to 1 (1m ea.) | £32 (c) | £34 (c) |
| BBC Cable Set 4 to 1 (1m ea.) | £39 (c) | £41 (c) |

**Computer Sharer:**
1 computer to 2 printers fitted with Cable for BBC TCS26 £19.50 (c)

## GRAPHICS PLOTTER

Basic 3 colour flat bed plotter £270 (a)
Opto Sensor £78 (d) Drill Router £79 (c)
**Basic Plotter can be powered from BBC psu**
External 12V psu £41 (c) External 12V psu (for drill router) £78 (c)

## BREAK-LOCK

A two-position key switch, fitting into the 'Ash-tray', that prevents accidental/unauthorised use of the Break key. £8.50 (c)

## PRINTER ACCESSORIES

**EPSON**
FX80 plus sheet feeder £129 (b); **LX80 sheet feeder** £49 (b)
Paper Roll Holder £17 (d) FX80 Tractor Attachment £37 (c)
Interfaces: 8143 RS232 £28 (c); 8148 RS232 + 2K £57 (c);
8132 Apple II £60 (c); 8165 IEEE + Cable £65 (c).
Serial & Parallel Interfaces with larger buffers available.
Ribbons: RX/FX/MX80 £5.00 (d);
RX/FX/MX 100 £10 (d); LX80 £6 (d)
Spare pens for HI80 £7.50/set (d)
**KAGA TAXAN:** RS 232 Interface + 2K buffer £78 (c);
Ribbon KP810/910 £6 (d)

**JUKI:** RS232 Interface £65 (c); Spare Daisy Wheel £14 (d);
Ribbon £2.50 (d);
Sheet Feeder £182 (a) Tractor Feed Attach £129 (a)

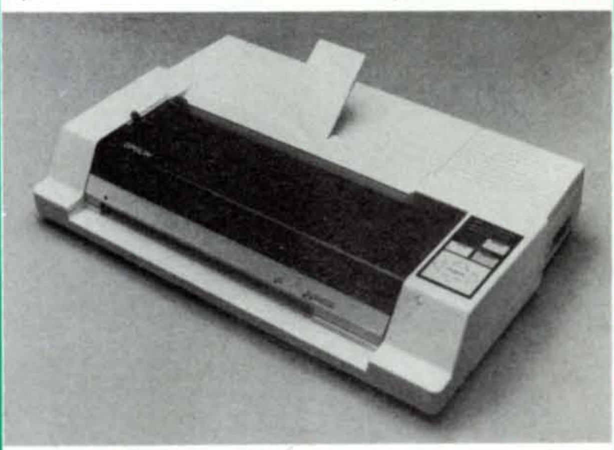
**BROTHER HR15:** Sheet Feeder £189 (a) Tractor Feed £99 (a)
Ribbons Carbon or Nylon £4.50 (d); Red Correction Ribbon £2 (d)

**BBC Printer Lead:** Parallel (42") £7 (d); Serial £7 (d)
Printer Leads can be supplied to any other length.

**Plain Fanfold Paper with extra fine perforation (Clean Edge):**
2000 Sheets 9.5" × 11" £13 (b) 2000 sheets 14.5" × 11" £18.50 (b)
Labels per 1000s: Single Row 3½" × 1 17/16" £5.25 (d)
Triple Row 2-7/16" × 1 7/16" £5.00 (d)

## EPSON HI-80 PLOTTER

EPSON technology has once again scored a first by introducing a sophisticated A4 size plotter that does not need specialised software or programming skills to operate it and yet keep the cost within the reaches of all computer users. Features include 4 pens at a time — upto 10 colours to choose from, a variety of pen nibs, high speed plotting. Powerful software command codes include single commands to plot circles, ellipses or triangles. Line or bar graphs and pie charts can be plotted in a variety of exciting styles very simply by keying in the data into the computer. Detailed leaflet on request.
**Epson Hi-80 Plotter** £345 (a)



## PRINTER SHARER/BUFFER

A unique sharer/buffer that provides a simple solution to improve system utilisation. It can be connected to up to three computers and it will automatically switch between the computers to scan for data — no manual switching required. High speed data input rate to the buffer cuts down the normal waiting time for the computers for the printing operation to complete and thus allowing the computers to be used for other uses. The 64K buffer would hold over 30 A4 pages of text.

Facilities include: COPY, PAUSE AND RESET. LED indication for percentage of memory available and data source. Mains powered. Send for detailed specification.

TSB 64 Buffer/Sharer £199 (a)
BBC Cable Set £30

## MONITORS

**All monitors supplied with BBC lead**

### MICROVITEC

ll 14″ monitors now available in plastic or metal cases, please pecify your requirement.

| 14″ RGB | | 14″ RGB with PAL & Audio | |
|---|---|---|---|
| **431** Std Res | £190 (a) | **1431** AP Std Res | £205 (a) |
| **451** Med Res | £240 (a) | **1451** AP Med Res | £280 (a) |
| **441** Hi Res | £389 (a) | These monitors can receive TV programs thru a Video Recorder | |

wivel Base for Plastic 14″ Microvitecs £20 (c)

**20″ RGB with PAL & Audio**

| | | | |
|---|---|---|---|
| **2030CS** Std Res | £380 (a) | **2040CS** Hi Res | £685 (a) |

### KAGA TAXAN 12″ RGB

| | | | |
|---|---|---|---|
| **VISION II** Hi Res | £240 (a) | **VISION III** Plus | £325 (a) |

**SUPERVISION III Plus** £275 (a)

**MITSUBISHI** 14″ RGB Med RES IBM & BBC Compatible £229 (a)

**SANYO CD3125NB** 14″ RGB Std Res £159 (a)

### MONOCHROME MONITORS:

| | |
|---|---|
| **SANYO DM8112CX** Hi Res 12″ Green Screen | £95 (a) |
| **KAGA KX1201G** Hi Res 12″ Etched Green Screen | £99 (a) |
| **KAGA KX1203A** Hi Res 12″ Etched Amber screen | £105 (a) |
| **PHILIPS BM7502** 12″ Hi Res Green Screen | £75 (a) |
| **PHILIPS BM7522** 12″ Hi Res Amber Screen | £79 (a) |
| Swivel Base for Kaga Monochrome fitted with Digital Clock | £21 (c) |
| Monitor Plinth for the BBC | £13.50 (b) |
| Double Tier Plinth for BBC and flat pack dual drive | £19.50 (b) |

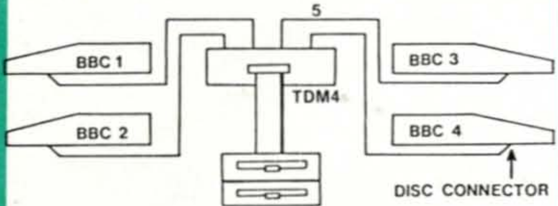
BBC Leads Kaga RGB £5(d) Microvitec £3.50 (d)
Monochrome £3.50 (d)

## TOUCHTEC-501

Designed for use with Microvitec metal cased monitors, and using the RS-423 socket, this unit brings genuine touch-screen operation to your BBC. Ideal for the educational market. Supplied with a users handbook and utilities disc containing starter programs and development software. **Touchtec 501** £260 (b)

## DISC DRIVE MULTIPLEXER

The cost-effective alternative to networking! A self-contained unit that enables up to four computers to be connected to one single or dual disc drive. No hardware modifications — simply plugs into the computers disc interface connectors. No ROMs or other software needed. All DFS commands work as normal. The switching of drives between computers is totally automatic and completely invisible to the user. This unit is ideal for installing in classrooms and other situations, where networking is not planned or necessary, or where costs must be kept low. In many cases software needs to be shared, although full networking complexity and cost is not needed. Several of these units can be connected in series to allow more computers to access the same discs, i.e. two quads connected together will allow 7 computers to share 1 drive. Units are supplied with 5′ of cable per outlet as standard. Mains powered.



| | |
|---|---|
| **TDM4** Quad Unit (up to 4 computers) | £135 (a) |
| **TDM2** Dual Unit (2 computers) | £75 (b) |

## DISC ACCESSORIES

Single Disc Cable £6 (d) Dual Disc Cable £8.50 (d)

**DISC STORAGE CASES**

10 Disc Library Case £1.80 (d) 30 Disc Case £6.00 (c)

**LOCKABLE CASES**

40 Discs £14 (c) 70 Discs £15 (c) 113710 Discs £16 (c)

## DISC DRIVES

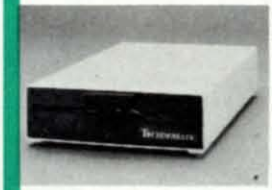
TECHNOMATIC drives are fitted with high quality slimline Japanese mechanisms and represent the state of the art in drive technology. The drives are built to the highest standards and are tested to their full performance capability before packaging.

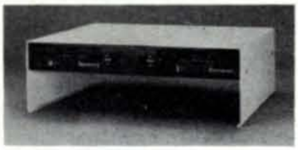
Single drives are available with or without integral mains power supply. The dual drive power supplies are switch mode type and are generously rated to ensure minimum heat generation even over long periods of operation. All drives with integral power supply are fitted with a mains indicator.

The drives are housed in attractively designed metal casings painted in hard wearing BBC matching paint. The dual drives can be supplied in stacked version or with built-in plinths. The plinth version cases are of sturdy construction to carry any monitor and provide a simple method of having a compact computer installation.

The 80T drives are supplied with the 40/80 track switching modules at no extra charge. The 40/80 track switches are conveniently positioned in the front on dual drives to enable easy switching between the tracks.

All drives are supplied with all the necessary cables, manual and a formatting disc. The mains powered drives are also fitted with a 13A mains plug suitably fused. The drives are ready to be fitted to the computer. All drives are capable of operating in single or double density modes.





| Single Drives: | | | With integral psu: | |
|---|---|---|---|---|
| 1 × 100K 40T SS | : **TS100** | £79(b) | **PS100** | £99 (b) |
| 1 × 400K 80/40T DS | : **TS400** | £85 (b) | **PS400** | £105 (b) |

**Dual Drives:** (with integral psu)

| Stacked Versions: | | Plinth Versions: | |
|---|---|---|---|
| **PD200** 2 × 100K 40T SS | £190 (a) | **PD200P** | £205 (a) |
| **PD800** 2 × 400K 80/40T DS | £229 (a) | **PD800P** | £249 (a) |

**3.5″ Drives:**

These compact drives, used with most of the new 16 bit micros offer fast access times and high performance with minimum of power consumption. The mechanisms are 80 track double sided and are capable of both single and double density operation. The single drive is offered in a dual case with a blanking plate for future upgrading. The drives come complete with cables, manual and formatting disc.

| | | | |
|---|---|---|---|
| **TS35** 1 × 400K 80T DS | £99 (b) | **TD35** 2 × 400K 80T DS | £175 (b) |

**Separate cased power supply** £20 (c)

### 3M FLOPPY DISCS

**Authorised Distributor**
**Data Recording Products**

3M

Industry standard high quality discs with guaranteed error free performance for life. Discs in packs of 10:

**5¼″ DISCS**

| | |
|---|---|
| 40 T SS DD £13 (d) | 40 T DS DD £18 (d) |
| 80 T SS DD £22 (d) | 80 T DS DD £24 (d) |

**3½″ DISCS**

80 T SS DD £30 (d)
80 T DS DD £38 (d)

## DRIVEHEAD CLEANING KIT

The **FLOPPICLENE** drive head cleaning kit is an ideal way to ensure the optimum performance of your drives. The use of disposable cleaning discs eliminates the risk of contamination and abrasion of sensitive driveheads. These risks are normally inherent in the reusable drivehead cleaning kits.

**Floppiclene with 20 disposable cleaning kits.** £14.50 (b)

# TECHNOMATIC

**01-208 1177**

**BBC Computer & Econet Referral Centre**

**MAIL ORDER**
17 Burnley Road
London NW10 1ED

**RETAIL SHOPS**
15 Burnley Road
London NW10 1ED
Tel: 01-208 1177
(close to Dollis Hill ⊖)

**West End Branch**
305 Edgware Road
London W2
Tel: 01-723 0233
(near Edgware Road ⊖)

**TECHNOLINE**
24 hour Viewdata Service 01-450 9764

Orders welcome from government depts & educational establishments.

**All prices ex VAT**

Please add carriage
(a) £8 (Datapost)
(b) £2.50
(c) £1.50
(d) £1.00.

# COMMUNICATIONS

## MODEMS

**BUZZ BOX** This pocket sized BT approved modem complies with V21 300/300 baud and provides an ideal solution for communications between users, with mainframe computers and bulletin boards. Suitable for use with Open University computer. Battery/mains powered.
**Buzz Box** £60 (c) Mains Adaptor £8 (d) BBC Data Lead £8 (d)

**MINOR MIRACLES WS2000** A world standard modem, having BT approval, covering V21, V23, (BELL 103/113/108 outside the UK) and including 75,300,600, 1200 Baud ratings. What possibly gives this modem its biggest advantage is its option of computer control. A 25Way RS232 input as well as possible computer controlled auto/dial/auto-answer makes this modem unique. **WS2000** £129 (c) BBC Serial Cable £7.

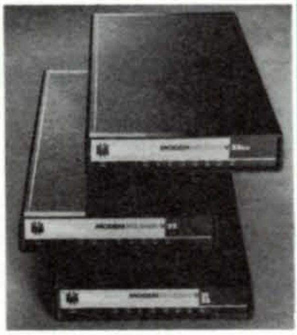
**WS2000 Auto-Dial card:** includes an integral loudspeaker for monitoring of the phone line £30 (d).
BBC User Port cable (for modem control) £4.

**SKI KIT** (Allowing total control of the modem by your computer) £10.

**DS1 Disc (for Commstar):** When used with the Auto-dial card, SK1 Kit, and a user port cable, this software will dial out to Prestel, enter your password etc. and leave you in Commstar. Will also store many bulletin board telephone numbers and protocols for autodialling £10.

**WS2000 Auto-Answer Card** £30(d).
(Please note that the A/D & A/A Cards are still awaiting BABT Approval.)

**DATA-BEEB** An advanced communication ROM from Miracle Technology. Its many features include both Viewdata (Prestel) and Terminal modes, Auto-Answer and Auto-dial for fully expanded WS 2000's etc. Macro facilities allow flexible use of its many facilities e.g. automatic dialling, log-on, going to a specific page, printing it, and going off-line, all in one operation. £25 (d)



**NEW WS-3000 RANGE** — the new professional series. All are intelligent and 'Hayes' compatible, allowing simply 'English' commands to control its many features. All models feature Auto-Dial with 10 number memory, Auto-Answer, Speed Buffering, printer port, data security option etc. All models are factory upgradeable.

**WS3000 V2123** (V21 & V23 + Bell) £295 (a)

**WS3000 V22** (as above plus 1200 baud full duplex) £495 (a)

**WS3000 V22bis** (as above plus 2400 baud full duplex) £650 (a)

The WS3000 range all have BT approval.

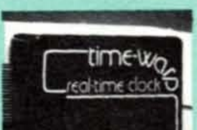
**COMMSTAR** An ideal communications Rom. Extremely easy to use, yet very versatile. It features both a Prestel mode as well as a Terminal mode, thus offering very good value for money. In Prestel mode, all normal Prestel features are available including, downloading of software, saving and retrieving of pages on disc, page tag, revealing of hidden text etc. Its terminal mode is ideal for bulletin boards etc. Any type of file, (not just ASCII) may be sent using XModem protocols. Even includes an elapsed time clock. £27 (d)

**TERMULATOR** Acorn's Communication Rom. £29 (b)

**COMMUNICATOR** This is a full 80 col VT100 terminal emulation program on 16K eprom. It is a more advanced program than TERMI and features easy to follow screen menus. The rate at which data is sent or received is easily set up with rates up to 19200 Baud with 80 column text. Allows files to be transmitted from disc, or a copy of incoming data to be sent to a file or to a printer. (Communicator is not suitable for PRESTEL). £57 (d)

# REAL-TIME CLOCK CALENDER

A low cost unit, allowing the facilities of units costing far more. Built to professional standards, it opens up the total spectrum of Real-Time applications. Possibilities include desk diary/planner, calender, continuous display of on-screen time and date information, automatic document dating, precise timing and control in scientific applications — its uses are endless. Simply plugs into the user port — battery backup is supplied as standard. A full manual as well as extensive software including a simple demonstration diary/planner application program on cassette (easily transferred to disc) — no ROMs needed. £29 (c)



# EPROMER II

EPROMER II
TECHNOMATIC LTD.

A sophisticated eprom programmer that handles the full range of popular single rail eproms (incl 27256) and allows the user full control of the programming process.
Its powerful menu driven software makes the programming of eproms simple, efficient and eliminates the need to have fiddly switches for selecting eprom types, programming voltage or method. The features include:

- Integral power supply ensures no power drain from the computer.
- Interfaces through 1 MHz bus, fully buffered.
- Clear and simple instructions displayed on the screen make the programming easy for both the first time user and the advanced user.
- Eproms upto 16K (27128) programmed in single pass.
- Selectable programming voltage 25/21/12.5V
- Selectable programming method — normal or high speed algorithmic. High speed programming enables 27128 to be programmed in just over 2 mins. Normal programming skips addresses with FF data to increase programming speed. Automatic verification on completion of programming.
- User can select any section of the eprom from a single byte to its full address range to Blank Check/Read/Program/Verify enabling program development/changes very simple.
- Full screen editor with HEX/ASCII input.
- Full tape/disc filing facility. Data input from keyboard/Tape/Disc/Eprom.
- Constant display of all options selected.
- Several BBC BASIC programs can be entered on a single eprom.
- Checksum facility allows for easy identification of programmed roms.

**EPROMER II** with Manual & Software on disc £99 (b)
ROM based software £10

# UV ERASERS

**UV1T** Eraser with built-in timer and mains indicator. Built-in safety interlock to avoid accidental exposure to the harmful UV rays. It can handle up to 5 eproms at a time with an average erasing time of about 20 mins. £59 (b)

**UV1B** as above but without the timer. £47 (b)

# ROM/RAM EXPANSION SYSTEMS

**ARIES B-32 BOARD:** Features 32K of RAM and a 16K ROM socket. RAM can be configured as 20K or 16K as shadow RAM and 12K or 16K or 32K sideways RAM. New commands include comprehensive sideways ROM/RAM management system, simplified direct access to screen RAM and the ability to move/swap the contents of any area of memory. ROM/RAM management system allows RAM allocation, list ROMs, load sideways RAM, disable ROMs, and extend any buffer including printer buffer.
**AIRES B32** RAM BOARD £80 (d)
**ARIES B12** ROM BOARD £40 (d)

**ATPL SIDEWISE ROM EXPANSION BOARD** A well constructed expansion board, simple to instal and requires no soldering. All buses are buffered. It allows full sideways rom expansion to 16 ROMs. One socket has been split into two 8K sockets to allow the use of 8K CMOS RAM. Battery backup option allows data retention in the RAM when the computer is switched off. Several link selectable options including write protect for the RAM. ATPL Board £39 (d) Battery Backup Kit £18 (d).

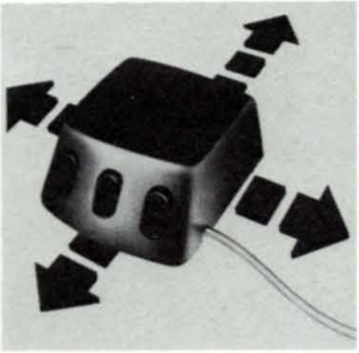
**RAMROM-15** The advanced sideways ROM/RAM expansion system. This an external unit, using high quality construction, attractively packaged in BBC coloured metal case, allowing easy access to all the sockets. N soldering is required. Allows 11/12 additional sideways ROMs to be fitt with an option of up to 16K sideways RAM. All commonly available RA can be used i.e. 4801/6116/6264 or xx128. Battery back-up fitted standard. For development work and further expansion, most of the 65 processor signals are available. Supplied with utility disc and full instructi manual. £86 (

## RB2 TRACKER BALL

A precision built tracker ball. Software allows RB2 to function, instead of cursor keys, for word processing, CAD/CAM etc. Software includes a graphics/CAD package.

| | |
|---|---|
| RB-2 (with 'microdraw'). | £52 (b) |
| RB-21 (with 'icon artmaster'). | £60 (b) |

## AMX MOUSE



This sophisticated mouse has many advanced features such as Icons, Windows etc. The supplied 'AMX ART' is a superb, yet simple-to-use CAD package allowing the creation of amazing graphical designs. A screendump for drawings is included. It can also be used with Wordwise/View to replace the cursor keys. Supplied complete with CAD Package, ROM and full instruction manual. **£69 (b)**

**AMX DESK** An organisational program, including memo-pad, telephone/address book, diary, alarm, calculator etc. On Disc. **£22 (d)**

**AMX PAINTPOT** **£13 (d)**

**AMX UTILITIES** Provides new drawing facilities including Zoom, colour sketch and more. On Disc. **£13 (d)**

**ACORN TELETEXT ADAPTOR £192 (a)**

## ACORN IEEE INTERFACE

This interface enables a BBC computer to control any scientific and technical equipment that conforms to the IEEE488 standard, at a lower price than other systems, but without sacrificing any aspect of the standard. The interface can link up to 14 IEEE compatible devices. Typical applications are in experimental work in academic and industrial laboratories, with the advantage of speed, accuracy and repeatability. The interface is mains powered and comes with cables, IEEEFS ROM, and user guide. **£282 (a)**

## DATABASE MANAGMENT SYSTEMS

**VIEWSTORE** An exciting, powerful database with many features: Display can be 'spreadsheet' or 'card-layout' type. Powerful selection and sorting utilities. Any screen mode can be used. Data can be sent to View and ViewSheet. Maximum file size 4096MByte! Maximum record size 60K. **£52 (d)**

**GEMINI DATAGEM** features include * almost unlimited file size (max 10Mbyte) * supports up to 4 drives * Max of 5000 records per file * max 6K record size * max of 62 fields * generates form letters from records.
Please ask for leaflet. **£79 (c)**

**STARdataBASE** A fast machine code, true random access database program in a 16K Eprom. Up to 4096 records in a file, up to 69 fields in a record. The record layout is totally user defined. Entirely menu driven — thus very user friendly. Extremely fast searches are possible using the Keysearch facility. Mailmerging from View and Wordwise, and address labelling. Its printer configuration suits any BBC compatible printer. **£69 (d)**

**CLARES BETABASE** **£21.50 (d)**

**MASTERFILE II** The new version of the popular general purpose file management system. It allows large amounts of information to be stored and processed. It is extremely powerful yet flexible to use. It allows up to 17 fields per record, and the only limitation as to the number of records is the capacity of the disc. Typically, using 5 fields, about 2000 records may be stored on a 100K disc. This latest version features many new facilities including use with WORDWISE/VIEW **£16.50 (d)** Disc (80 or 40T).

## CP/M SOFTWARE FOR TORCH & ACORN Z80 PROCESSORS

**We can now supply almost any CP/M based software package in a format suitable for the Torch Z80 and Acorn Z80 second processors.**

**WORDSTAR PROFESSIONAL** The advanced word processing package comprising of WordStar, MailMerge, StarIndex and SpellStar, a total combination offering substantial savings on individual prices. WordStar is the best selling word processing program on the market. Extensive operator aids include a comprehensive yet friendly manual, step-by-step training guide, command cards, on-screen menus with four levels of help messages etc. etc. SpellStar checks text files against its 20,000 word-plus dictionary. You can both add to the dictionary and create specific supplementary ones. Mailmerge is ideal for mailing applications where lists are selected on a range of criteria. It enables the fast production of personalised form letters, mailing labels, invoices, etc. StarIndex creates alphabetical indexes, tables of contents, paragraph numbering and much more.

**WORDSTAR PROFESSIONAL £310 (a)**

**WORDSTAR £275 (a) MAILMERGE £145 (a)**

**DBASE-II** Undoubtedly 'The Database', can be used for an almost limitless number of business applications, ranging from mailing list preparation and maintenance through to running accounting ledgers and payrolls. In addition to standard database features it provides much more. An on-disc tutorial takes you from setting up a simple file all the way through to setting up custom screens and reports. Automatic calculations may be performed on data, and fields or entire databases may be modified or replaced with single, English-like basic commands; Dbase-II can therefore be used by general personnel having no programming knowledge. It can be tailored to suit a variety of professions and individual needs, with files such as accounting, payroll, time billing, job costing, scheduling and mailing lists. It can access several files at a time. It is fast, flexible and powerful. **£335 (a)**

**SuperCalc-2** A powerful decision making tool which helps to solve complex 'What if...' financial modelling and forecasting questions. With a working area of 63 columns and 255 rows, Supercalc 2 takes full advantage of colour and full memory. It allows consideration of different spreadsheet files, sorting, a wide choice of formats. Full documentation with easy to follow lessons and single key commands make the use of Supercalc2 very easy. Separate windows provide for display of results and formulae simultaneously. Calendar and date calculations simplify calculations on loan repayment and periods. **£180 (a)**

**Pro-Pascal** A full implementation of the International Standard for Pascal (ISO 7185) apart from the optional conformant parameters feature. In addition to the standard features of Pascal, Pro Pascal includes: dynamic strings for character and string manipulation, 9 digit integers and random access file handling for data processing applications, single and double precision floating point arithmetic, an assembler level interface for systems programmers, and separate compilation of program segments for building libraries of commonly used procedures and enabling very large object programs to be constructed. Pro Pascal is a 3 pass compiler, converting a source program into efficient Z80 machine code. The package includes a compiler, run-time library, link editor, library manager and cross referencing utility. **£220 (a)**

**BSTAM** A telecommunication facility used for transmitting any size CP/M file. **£165 (b)**

Other packages available include CIS-COBOL, INFOSTAR, DMS +, FMS, SAGE, ATITUTORIALS, MACRO-80 etc. Please telephone with your requirements.

## TORCH GRADUATE IBM SOFTWARE

We are able to supply most popular software packages including: WORDSTAR, WORD, EASY-WRITER, DBase-II & III, LOTUS-123, VISICALC, SAGE etc. Please telephone with your requirements.

# TECHNOMATIC

**01-208 1177**

**BBC Computer & Econet Referral Centre**

**MAIL ORDER**
17 Burnley Road
London NW10 1ED

**RETAIL SHOPS**
15 Burnley Road
London NW10 1ED
Tel: 01-208 1177
(close to Dollis Hill ⊖)

**West End Branch**
305 Edgware Road
London W2
Tel: 01-723 0233
(near Edgware Road ⊖)

**TECHNOLINE**
24 hour Viewdata Service 01-450 9764

Orders welcome from government depts & educational establishments.

**All prices ex VAT**

Please add carriage
(a) £8 (Datapost)
(b) £2.50
(c) £1.50
(d) £1.00.

# ROMs/SOFTWARE

## WORD-PROCESSORS

**VIEW** Acorn's version V2.1 word processor rom. £48 (c)

**VIEW VERSION V3.O** Also compatible with BBC + Complete with Printer Driver Generator. £78 (c)

**HI VIEW** Disc based version of VIEW word processor for use with the 6502 2nd processor. Allows 47K of user memory. £52 (c)

**VIEW INDEX** Disc based program to create an index from VIEW text files. Ideal for anyone concerned with writing extensive reports or books. £13 (d)

**WORDWISE** £34 (d)

**WORDWISE PLUS** The new advanced Wordwise on a 16K eprom, for the more specialised users who require added features and flexibility. Four new programs are also supplied allowing mail-merging, index generating, two-column text printout and continuous processing. £49 (d)

**SPELLCHECK-I** £15 (d)

**SPELLCHECK II** A ROM based fast machine code program that works with both VIEW and WORDWISE. Vocabulary disc supplied with 6000 words can be expanded to well over 17,000 words on 100K drive. Fully compatible with 6502 second processor. £24.50 (d)

## SPREADSHEETS

**VIEWSHEET** Acorn's spreadsheet provides 255 columns and 255 rows and will operate in any mode. Windows can be created which can then be rearranged to provide any print format required. Function keys provide for easy entry of commands. Printer control codes can be used using the printer driver. Fully compatible with VIEW and the 6502 2nd Processor. £48 (d)

**ULTRACALC 2** This enhanced version of the original BBC Publications popular spreadsheet ROM includes many new features including full compatability with the 6502 2nd processor running as HiCalc allowing 44K of user memory, operate in any mode, greater flexibility in printer control, spooling as ASCII file etc. All these features are in addition to the existing powerful features such as handling of labels and numbers as values. Column width control and features normally found in well designed spreadsheets. £52 (d)

**INTERSHEET** The new spreadsheet from Computer Concepts. Many advanced facilities including 105 character display, several spreadsheets may be used at once, may be used with View & Wordwise etc. etc. £49 (c)

**INTERCHART** Graphics Package for the Intersheet. £38 (d)

## LANGUAGES

NEW

**META-ASSEMBLER.** Both an Editor and Macro-assembler. Meta can assemble 65xx, 68xx/63xx incl. 00, 01, 02, 03, 05, 6809, 65816, 8048 series 8080/8085, Z8, Z80.

Free upgrades coming soon include 68000, 8088/8086 Z8000.

Features include: Macros and IF/ELSE/ENDIF conditional assembly (nestable), Global/Selective Search, error detection, Complex expressions, two parts assembly. Code may be sent to disc, sideways RAM, user/printer port, RS423 etc.

**META-ASSEMBLER** includes 16K Eprom, disc and comprehensive manual. £59 (c)

**6502 DEVELOPMENT PACKAGE** A Macro-Assembler with utilities for use with the 6402 2nd Processor. Enables the serious programmer to develop large programs in assembly language. £43.35 (d)

**ISO-PASCAL** Acorn's full implementation of International Standard Pascal on two 16K ROMs. Disc Version for use on 6502 2nd Processor also supplied. Comprehensive manual. £60 (c)

**ACORN LOGO** A full implementation of the Logo language from Acornsoft. Supplied as two ROMs with a tutorial course and technical manual. £60 (b)

**BCPL** A full implementation of the BCPL compiler language consisting of the language of ROM, disc containing the BCPL compiler, a screen editor, a 6502 assembler, other utilities and programming aids and examples of BCPL code and a 450 page manual. £52 (b)

**BCPL CALCULATIONS PACKAGE** Supplied on disc, it supports floating point, fixed point and fast integer calculations. It includes the BCPL calcultion files, example files and a comprehensive user guide. £17.30 (b)

**BCPL STAND ALONE GENERATOR** Utilities in this package enable the programs developed using the BCPL ROM to be converted so that they can be run on any BBC micro whether it has a BCPL ROM or not. Stand alone programs for other 6502 based systems can also be developed. £43 (d)

**ACORN LISP Rom** £43 (d); **FORTH** £43 (d); **COMAL** £43 (d)

**MICROTEXT** The authorising system from the National Physical Laboratory. **Disc** £53 (b) **Cassette** £43 (b)

**G:FORTH** An advanced implementation of FORTH which follows the 79-Standard specification on a 16K ROM and has a full double number extension set. It incorporates an editor, 6502 assembler, very fast turtle graphics and supports extensive string and file handling. It contains 540 predefined words including those for reading joystick ports, produce sounds, set and read the time and produce random numbers. Fully compatible with disc or tape filing systems and works in any mode. Package comes complete with a USER GUIDE, Introduction to FORTH and 16K GFORTH ROM. £41 (d)

**OXFORD PASCAL** A fast, compact P-Code compiler, that fully utilises BBC Graphics and sound, contains a powerful editor, and produces 'standalone' software. £43 (c)

# UTILITIES

**ACCELERATOR** From Computer Concepts — Finally, a comprehensive compiler that will compile existing BBC Basic programs, simply, and in most cases, without alteration. Compiles to either intermediate code or machine code. Supplied with two Roms, manual, utility disc etc. £56 (d)

**SPEECH ROM** From Computer Concepts — allows infinite speech with the Acorn speech system using simple * commands. Pitch and emphasis can be altered — even singing is possible! £29 (c)

**SPEECH PROCESSOR ROM** £12 (d)

**DISC DOCTOR** Computer Concept's popular disc utility ROM which adds 20 commands to the DFS system. £26 (d)

**GRAPHICS ROM** £24 (d)

**PRINTMASTER** The ROM that features the most versatile screen dumps for the Epson MX/RX/FX80 and KAGA PRINTERS. Includes mode 7, magnification, character definition, enlarged text, etc. — in short — this ROM does it all! £27 (d)

**BROM** The new utility ROM from Clares — a Toolkit ROM that gives you full screen editing. Many extra functions are included. £28 (d)

**REPLICA II** 40 & 80 Track Versions available. £9.75 (d)

**EXMON-II** Advanced M/C Monitor. £22 (d)

**TOOLKIT** Adds 27 new commands to BBC Basic. £21 (d)

**SLEUTH** Basic Debugger £21 (d)

**HELP** ROM based comprehensive on screen HELP facility to aid and speed up programming. £19 (d)

**DUMPMASTER** Disc based dumps for many printers. £9 (d)

**HERSEY CHARACTER** Font generator £11.00 (d)

**BILLBOARD** A useful program that enables your BBC to produce superlarge 'Billboard' type characters i.e. a continuous horizontal scrolling of super-large characters. £15 (d)

**DISCMASTER** Disc Utility. £15 (d)

**BEEBUG SUPERPLOT Cass** £7.50 (d) **BEEBUG DESIGN** £15 (d)

**MUROM** Music Development ROM. £17 (d)

**When ordering software on disc please specify track format (40/80)**

# BOOKS

**(No VAT, p&p £1.50 per book)**

**CPU/Assembly Language Books**

| | |
|---|---|
| 6502 Applications | £12.50 |
| 6502 Assy Lang Prog | £19.95 |
| 6502 M/C for Beginners | £ 5.95 |
| 6502 Advanced Programming | £11.95 |
| 6502 Programming | £13.95 |
| 6809 Assy Lang Programming | £13.45 |
| 6809 Programming | £12.95 |
| 8086 Book | £23.95 |
| Prog. the 8086/89 | £14.95 |
| Programming the 6800 | £19.95 |
| Programming the Z80 | £16.95 |
| Z80 Ass./Lang Prog | £19.95 |
| 8087 Applications and Programming (IBM) PC | £22.25 |

**LANGUAGES**

| | |
|---|---|
| BBC Micro Sideways Roms Rays | £ 9.95 |
| CP/M Handbook | £13.95 |
| Mastering the CP/M | £16.50 |
| FORTRAN Cookbook | £ 8.00 |
| Introduction to PASCAL | £16.50 |
| Prog the Micro with PASCAL | £ 8.50 |
| The UNIX Book | £12.50 |

**BBC Micro Books**

**Books for Beginners:**

| | |
|---|---|
| BASIC programming on the BBC — Cryer | £ 5.00 |
| BBC BASIC | £ 4.00 |
| BBC BASIC for Beginners | £ 4.00 |
| BBC Micro for Beginners | £ 4.75 |
| Century Computer Prog | £ 9.95 |
| Drawing Your Own BBC Programs | £ 6.95 |
| Easy Prog for the BBC Micro | £ 5.00 |
| Friendly Computer Book | £ 3.50 |
| Gateway to Computing BBC1 | £ 4.95 |
| Gateway to Computing BBC2 | £ 4.95 |
| Introducing the BBC Micro | £ 4.50 |
| Mathematical Programs in BBC Basic | £ 7.95 |

**Languages/Programming**

| | |
|---|---|
| 30 Hours BASIC | £ 6.95 |
| Advanced User Guide | £12.50 |
| Adv BASIC Rom User Guide | £ 7.50 |
| Advanced Prog Tech for BBC | £ 8.95 |
| Applied Ass./Lang on the BBC | £ 7.95 |
| Ass./Lang Made Easy for BBC | £ 5.95 |
| Assy. Lang. Prog. made easy | £ 5.95 |
| Applied Assembly Lang on BBC | £ 7.95 |
| BASIC Rom User Guide | £ 9.95 |
| Applied Ass./Lang on the BBC | £ 9.95 |
| BBC Micro Advanced Programming | £ 9.95 |
| BBC Micro Sideways ROM's RAM's | £ 9.95 |
| BCPL User Manual Acorn | £15.00 |
| Creative Assembler on BBC | £ 5.95 |
| Discovering BBC M/C | £ 6.00 |
| Guide to the BBC ROM | £ 9.95 |
| Exploiting BBC BASIC | £ 6.95 |
| FORTH Acorn | £ 7.50 |
| Further Programming for BBC | £ 4.00 |
| LISP Acorn | £ 7.50 |
| Programming the BBC | £ 6.50 |
| Structured Programming | £ 6.50 |
| S-PASCAL Acorn | £ 7.50 |
| Using BBC BASIC | £10.00 |
| Word Processing on BBC (Wordwise + Epson) | £ 5.25 |

**SOUND & GRAPHICS**

| | |
|---|---|
| Advanced Graphics with BBC | £ 6.00 |
| BBC Graphics & Sound | £ 7.50 |
| BBC Micro BASIC, Sound & Graphics | £ 7.50 |
| Creative Sound on the BBC | £ 9.95 |
| Graphics on the BBC Micro | £ 6.00 |
| Turtle Graphics | £ 7.50 |

**EDUCATIONAL**

| | |
|---|---|
| BBC Micro in Education | £ 6.50 |
| Prog for Education (Pri.Sch) | £ 5.95 |

**DISC DRIVE SYSTEMS**

| | |
|---|---|
| Advanced Disc User Guide | £14.95 |
| BBC Micro Disc Companion | £ 7.95 |
| Disc-Drive Projects for Micro's | £ 5.95 |
| Disc Book | £ 3.50 |
| Disc Programming Techniques | £ 7.95 |
| Disc Systems | £ 6.95 |
| Using Floppy Discs | £ 6.95 |

**APPLICATIONS**

| | |
|---|---|
| BBC Filing Systems & Databases | £ 7.95 |
| BBC Software Projects | £ 6.95 |
| Business Programming on BBC | £ 7.95 |
| Business Applications on BBC | £ 7.95 |
| DIY Robotics & Sensors | £ 6.95 |
| Interfacing Projects for BBC | £ 6.95 |
| Making Music on the BBC | £ 5.50 |

**GAMES**

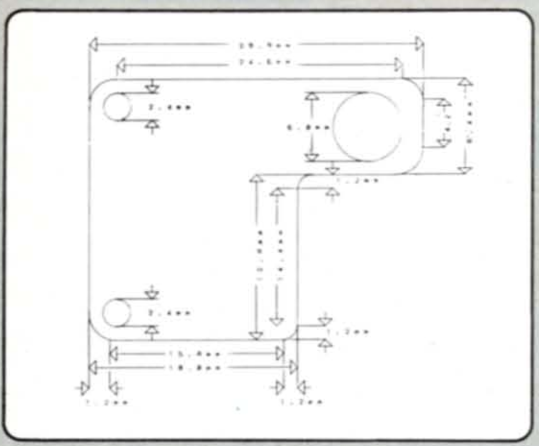
| | |
|---|---|
| 100 Programs for the BBC | £ 6.00 |
| BBC User Guide Acorn | £15.00 |

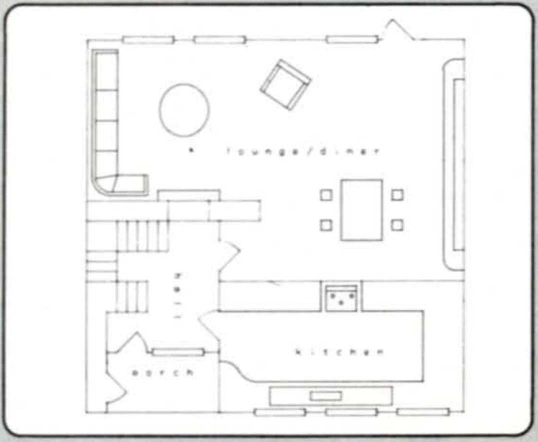
**MISCELLANEOUS BOOKS**

| | |
|---|---|
| 6522 VIA Book | £ 4.50 |

# NOVACAD

## Computer Aided Draughting for the BBC Micro





**A sophisticated CAD package with unique facilities which until were confined to custom built CAD packages.**

**Whether you want to draw a complex electronic circuit diagram or plan your new kitchen or simply draw a cube NOVACAD will help you do it better and more easily.**

**All you need is a BBC micro model B fitted with Acorn DFs and a single disc drive. If you have a 6502 2nd processor and a dual disc drive then NOVACAD's capabilities are further enhanced.**

- Very user friendly with all commands and controls from the keyboard. Special windowing techniques make available to the user almost one million dots allowing a lot more detail to be put on the drawing than one would normally expect the BBC to be capable of. (Mode O screen display only 1/6 the number of dots). The drawing can be 4 windows across and 5 up.
- Libraries of user defined ICONS such as electronic symbols can be created easily and edited even in the middle of drawing another diagram. ICON size is not limited to a number of pixels. An ICON can contain up to 500 lines, so complete drawings or sections of large drawings can be saved as ICONS for use with other drawings.
- ICONS can be called by name from a library into any part of the diagram and can be moved, enlarged, reduced, rotated in 90° steps and have mirror images made before being finally positioned.
- The zoom facility allows the user to magnify any section of a drawing by up to 20 times to make it easier to insert details.
- User definable grid helps the user set his own scaling for the drawings.
- Horizontal and vertical displacements can be measured in any user defined scale.
- Any two colour can be used in mode 4.
- Up to '8 levels' can be used to produce multi layer drawings, and then user can decide which levels are to be displayed. This can be particularly used in pcb drawings, architectural drawings with details of the services behind the walls displayed only when required and many other such applications.
- Text can be added at any position vertically or horizontally.
- Use of 2nd processor will allow use of 4 colours, higher pixel density drawings and considerably faster operation. (NOVACAD without the 2nd processor if faster than any other CAD package we have seen for the BBC).
- Powerful delete facilities allow deletion of single lines or whole sections with minimum of key presses.
- Printer dump for Epson compatible printers incorporated in the software which allows a full or a sectional screen dump.
- An optional plotter utility will allow output to a range of popular plotters for high quality diagrams.

**NOVACAD will prove to be an invaluable teaching aid in technical schools and colleges and for anyone involved in draughting it will be an ideal labour saving tool.**

**NOVACAD package with 16K ROM, Utility disc and a comprehensive manual £79 (c).**

**Novacad compatible with Tracker Ball £99 (c).**

**Upgrading of existing ROMs and DISCS £20 (d).**

**Plotter Utility Program £21.50 (d).**

## BBC COMPUTER SPARE PARTS (Carriage code (d)

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Complete Keyboard | £52 | 6502A 2MHz CPU | £6.50 | UPD7002 | £5.00 | 74LS163 | £0.75 |
| Power Supply Unit | £52 | 65CO2 CMOS CPU | £12.00 | DS3691 | £3.50 | 74LS244 | £0.80 |
| Keyswitch | £1.75 | 6522 VIA | £3.50 | 7438 | £0.40 | 74LS245 | £1.10 |
| Keyboard Connector | £4.50 | 6522A 2MHz VIA | £5.50 | 74LSOO | £0.24 | 74LS373 | £0.90 |
| Video ULA | £18.00 | LM3 24 op-amp | £0.45 | 74LSO4 | £0.24 | 74LS393 | £1.00 |
| Serial ULA | £14.00 | SAAO5O-Teletext | £9.00 | 74LS10 | £0.24 | 8271 | £48.00 |
| UHF Modulator | £4.50 | 6845SP CRT Controller | £6.50 | 74LS123 | £0.80 | 88LS120 | £3.00 |

# TECHNOMATIC

## 01-208 1177

**BBC Computer & Econet Referral Centre**

**MAIL ORDER**

17 Burnley Road
London NW10 1ED

**RETAIL SHOPS**

15 Burnley Road
London NW10 1ED
Tel: 01-208 1177
(close to Dollis Hill ⊖)

**West End Branch**
305 Edgware Road
London W2
Tel: 01-723 0233
(near Edgware Road ⊖)

**TECHNOLINE**
24 hour Viewdata Service 01-450 9764

Orders welcome from government depts & educational establishments.

**All prices ex VAT**

Please add carriage
(a) £8 (Datapost)
(b) £2.50
(c) £1.50
(d) £1.00.

# p&h electronics Ltd

**5 THE PARADE · YATELEY**
**HANTS**
**TEL: 0252 877222**

**22/24 GUILDFORD ROAD**
**BAGSHOT · SURREY**
**TEL: BAGSHOT 0276 73078**

## BBC MICRO CENTRES

*TELEPHONE OR VISIT*

ALL PRICES INCLUDE VAT
PRICES ARE SUBJECT TO CHANGE WITHOUT NOTICE

**FAST PHONE/MAIL SERVICE – SAME DAY DESPATCH ON ITEMS IN STOCK**

**SUPPLIERS TO SCIENTIFIC AND EDUCATION AUTHORITIES**

## ACORN

| | |
|---|---|
| BBC B | £349.00 |
| BBC B Plus (64k) | £469.00 |
| Electron | £129.00 |
| Z80 2nd Processor + Business Software | £399.00 |
| 6502 2nd Processor | 199.00 |
| IEEE Interface | 325.00 |
| Bit Stick (CAD High Res Joystick) | £375.00 |
| Teletext Receiver | £225.00 |
| Prestel Receiver | 139.00 |
| Music Synthesiser -500 | £199.00 |
| Acorn DNFS Kit | £110.00 |
| Speech Kit | £45.00 |
| Data Cassette Recorder | 35.00 |
| Electron Plus 1 | £59.00 |
| Electron Plus 3 (with Disc Drive) | £229.00 |
| Econet Components | P.O.A. |

## MONITORS

**MONO**

| | |
|---|---|
| Philips BM7502 Green High Res | £79.00 |
| Philips BM7522 Amber High Res | £85.00 |
| Ferguson MM02 Green High Res | £79.00 |
| Ferguson MM06 Amber High Res | £79.00 |
| Sanyo DM8112CX Green Very High Res | £115.00 |

**COLOUR**

| | |
|---|---|
| Microvitec 1431 Standard Res | £215.00 |
| Microvitec 1451 Medium Res | £285.00 |
| Microvitec 1441 High Res | £485.00 |
| Sony KX 14CPI Multi-Standard (NEW) | £390.00 |

**TELEVISION/MONITORS**

| | |
|---|---|
| Hitachi 1444 14in CTV + RGB | £199.00 |
| Ferguson MC01 14in CTV + RGB | £215.00 |
| Saba(Normende 14in CTV + RGB | £215.00 |

## PRINTERS

**DOT MATRIX**

| | |
|---|---|
| Tally MT80 + 100cps | £215.00 |
| Tally MT85 with NLQ | £350.00 |
| Epson P40 | £90.00 |
| Epson RX80FT+ | £250.00 |
| Epson FX80+ | £385.00 |
| Epson NLQ Board for RX and FX+ | £119.00 |
| Epson LX80 with NLQ | £255.00 |
| Epson LX80 Tractor Unit | £25.00 |
| Epson LX80 Sheet Feeder | £55.00 |
| Kaga Taxan 810 with NLQ | £270.00 |
| Kaga Taxan 910 with NLQ | £439.00 |
| Seikosha SP-800 with NLQ 'NEW' | £215.00 |
| Panasonic KXP1092 with NLQ 180/33 cps | £430.00 |

**DAISYWHEEL**

| | |
|---|---|
| Juki 2200 with Keyboard | £299.00 |
| Juki 6100 | £399.00 |
| Silver Reed EX500 | £320.00 |
| Silver Reed EX43 with Keyboard | £399.00 |
| Brother HR15 | £395.00 |

## DISK DRIVES

**CUMANA**

| | |
|---|---|
| CSX100/L 100k S/S 40T | £95.00 |
| CSX400 400k D/S 40/80T | £145.00 |
| CS100 100K S/S 40T with P.S. | £125.00 |
| CS400 400k D/S 40/80T | £175.00 |
| CD200 Dual 100k S/S with P.S. | £235.00 |
| CD400 Dual 200k D/S with P.S. | £280.00 |
| CD800 Dual 400k D/S 40/80T | £299.00 |
| CSX351 3.5in 100k S/S 40T | £135.00 |
| CSX354 3.5in 400k D/S 80T | £190.00 |
| (NEW) CDX800X 400k D/S 40/80T No P.S. | £269.00 |

## ACCESSORIES

| | |
|---|---|
| Ferguson 3T31 Data Recorder | £29.00 |
| Sanyo 101 Data Recorder | £29.00 |
| Data Recorder – BBC Lead | £4.00 |
| Full Proportional Joy Stick | £12.50 |
| Full Proportional Joy Stick Pair | £20.00 |
| Voltmace 14b Joystick | £14.50 |
| Light Pen R+H with Software | £45.00 |
| AMX Mouse | £75.00 |
| AMX Utilities Software | £13.50 |
| AMX Desk | £22.00 |
| AMX Paintbox | £13.50 |
| Modem Nightingale with Commstar | £155.00 |
| Modem Auto Answer Board + Software | £75.00 |
| EMI Tracker Ball and Software | £55.00 |
| Sideways ROM Board | £45.00 |
| RAM-ROM 15 Sideway ROM System | 110.00 |
| Computer Desk Double Width | £69.00 |
| Disc Storage Box (50) | £19.00 |
| Disc Storage Box (80) | £23.00 |
| Printer Lead Serial – BBC | £10.00 |
| Printer Lead Parallel – BBC | £12.00 |
| 5¼in Discs 10 in Library Case DS/DD | £20.00 |
| TV Aerial/Computer Switch | £2.50 |
| BBC Key Function Key Mask | £2.00 |
| Giant Reference Card for BBC | £2.50 |
| Computer Covers Soft – State Type | £5.00 |
| Computer Covers Hard – BBC and Electron | £10.00 |
| Printer Covers – State Type | £5.50 |
| Disc Drive Covers – State Type | £5.00 |
| Monitor Plinth – Metal to Match BBC | £20.00 |
| Monitor Plinth – Wood Grain | £10.00 |

## ACORNSOFT-VIEW

| | |
|---|---|
| View – Wordprocessor ROM | £50.00 |
| Hi-View – For 2nd 6502 Processor | £50.00 |
| Viewsheet – Spreadsheet ROM | £50.00 |
| View Index Disc | £15.00 |
| View Store – Database ROM | £52.00 |
| Printer Driver Generator – Cassette | £10.00 |
| Printer Driver Generator – Disc | £11.50 |
| View Guide Book | £3.00 |
| Into – View Book | £3.00 |
| View Sheet Manual | £10.00 |

## ACORNSOFT BOOKS-

| | |
|---|---|
| Creative Graphics | £7.50 |
| Graphs and Charts | £7.50 |
| Lisp Manual | £7.50 |
| Forth manual | £7.50 |
| Pascal Manual | £7.50 |
| Comal Manual | £11.50 |
| BCPL Manual | 15.00 |

## ACORNSOFT

| | |
|---|---|
| Forth Cassette | £16.50 |
| Forth Disc | £19.50 |
| Forth ROM | £47.00 |
| Lisp Cassette | £16.50 |
| Lisp Disc | £19.50 |
| Lisp ROM | £47.00 |
| S-Pascal Cassette | £16.50 |
| S-Pascal Disc | £19.50 |
| ISO - Pascal ROM | £62.00 |
| BCPL ROM | £95.00 |
| Comal ROM | £47.00 |
| Logo ROM | £65.00 |
| Turtle Graphics Cassette | £16.50 |
| Graphics Extension ROM | T.B.A. |
| Microtext Cassette | £47.00 |
| Microtext Disc | £55.00 |
| Creative Graphics Cassette | £9.50 |
| Graphs and Charts Cassette | £9.50 |
| French for Electron Also | £14.50 |
| Italian for Electron Also | £14.50 |
| Spanish for Electron also | £14.50 |
| German for Electron also | 14.50 |
| Mailing List Disc | £23.50 |
| Invoicing Disc | £23.50 |
| Order Processing Disc | £23.50 |
| Purchasing Disc | £23.50 |
| Stock Control Disc | £23.50 |
| Accounts Payable Disc | £23.50 |
| Database Disc | £16.50 |

## TOP GAMES

| | |
|---|---|
| Doctor Who | P.O.A. |
| Elite | Cas. £13.50 Disc £16.50 |
| Elite – Electron | Cas. £12.50 |
| Elite II for 2nd 6502 | Disc T.B.A. |
| Revs | Cas. £13.50 Disc £16.50 |
| Aviator | Cas £13.50 Disc £16.50 |
| Castle Quest | Cas. £11.00 Disc £13.00 |
| Scrabble | Cas. £12.50 |
| Whiteknight 12 Chess | Cas. £9.50 |
| Snooker | Cas. £9.50 Disc £11.00 |
| Acheton | Disc £16.50 |
| Combat Lynx BBC and Electron | Cas. £8.50 |
| Repton | Cas. £9.50 Disc £11.50 |

## ROMS/UTILITIES

| | | |
|---|---|---|
| Wordwise Plus | Rom | £49.00 |
| Intersheet | Rom | £50.00 |
| Interchart | Rom | £34.00 |
| Disc Doctor | Rom | £29.00 |
| Printmaster | Rom | £29.00 |
| Graphics | Rom | £29.00 |
| Caretaker | Rom | £29.00 |
| Accelerator | Rom | £60.00 |
| Speech | Rom | £29.00 |
| Termi II | Rom | £32.00 |
| Communicator | Rom | £65.00 |
| Toolkit | Rom | £26.00 |
| Exmon II | Rom | £26.00 |
| Murom (Music) | Rom | £28.00 |
| Master File II | Disc | £18.00 |
| Help | Rom | £24.00 |
| Sleuth | Rom | £28.00 |
| Spellcheck II (View + W/W) | Rom | £30.00 |
| Spellcheck (View) | Disc | £18.00 |
| Spellcheck (Wordwise) | Disc | £18.00 |
| Hershey Characters | Disc | £14.00 |
| Hershey Characters | Cassette | £9.00 |
| Advanced Disc Tookit | Rom | £33.00 |
| ADE | Rom | £55.00 |
| Logo (LCSI) | Rom | £59.00 |
| BBC Ultracalc II | Rom | £69.00 |
| Stardatabase | Rom | £69.00 |
| Replica II 40/80 | Disc | £12.00 |
| Beta Base 40/80 | Disc | £23.00 |
| Vine Replay Disc Utility | Rom | £33.00 |
| Vine Tape to Disc | Rom | £18.00 |
| Island Logic Music | Cassette 1 | £12.00 |
| Island Logic Music | Cassette 2 | £12.00 |
| Island Logic Music | Disc | £24.00 |

## COMPUTER BOOKS-

| | |
|---|---|
| BBC User Guide | £12.50 |
| BBC User Guide Binder | £3.95 |
| Advanced User Guide | £12.95 |
| Advanced User Guide Binder | £3.95 |
| Advanced Basic ROM BBC | £7.95 |
| Advanced Graphics with the BBC | £9.95 |
| Applied Assembly Language | £7.95 |
| 30 Hour Basic | £6.95 |
| Basic ROM User Guide | £9.95 |
| BBC Micro Disc Companion | £7.95 |
| Disc Programming for the BBC | £7.95 |
| The BBC Micro ROM Book | £9.95 |
| Word Processing on the BBC Micro | £5.25 |
| Complete Forth | £6.95 |
| Logo Programming | £8.95 |
| Basic for Business | £6.95 |
| 6502 Applications | £7.95 |
| 6502 Assembly Language Programming | £19.95 |
| 6502 Assembly Language Subroutines | £19.95 |
| Z80 Applications | £14.50 |
| Z80 Assembly Language Programming | £19.95 |
| Z80 Assembly Language Subroutines | £19.95 |
| Get More from Epson Printer | £7.95 |
| Word Processing Book | £4.95 |
| Word Star and CPM Made Easy | £6.95 |
| Word Star Fast Reference Guide | 4.35 |
| Word Star Made Easy | £16.95 |

## MAIL ORDER COUPON

**P&H ELECTRONICS LIMITED**
**22/24 GUILDFORD ROAD · BAGSHOT · SURREY GU19 5JN**

*Please send me:* (or order by letter)

1 ____________ 4 ____________
2 ____________ 5 ____________
3 ____________ 6 ____________

I enclose cheque/PO for ____________ P&P see above ______

Or please debit my Access/Barclaycard/Visa* *(delete as applicable)*

Card Number ____________ Expiry Date ____________

FAST VAT FREE EXPORT SERVICE

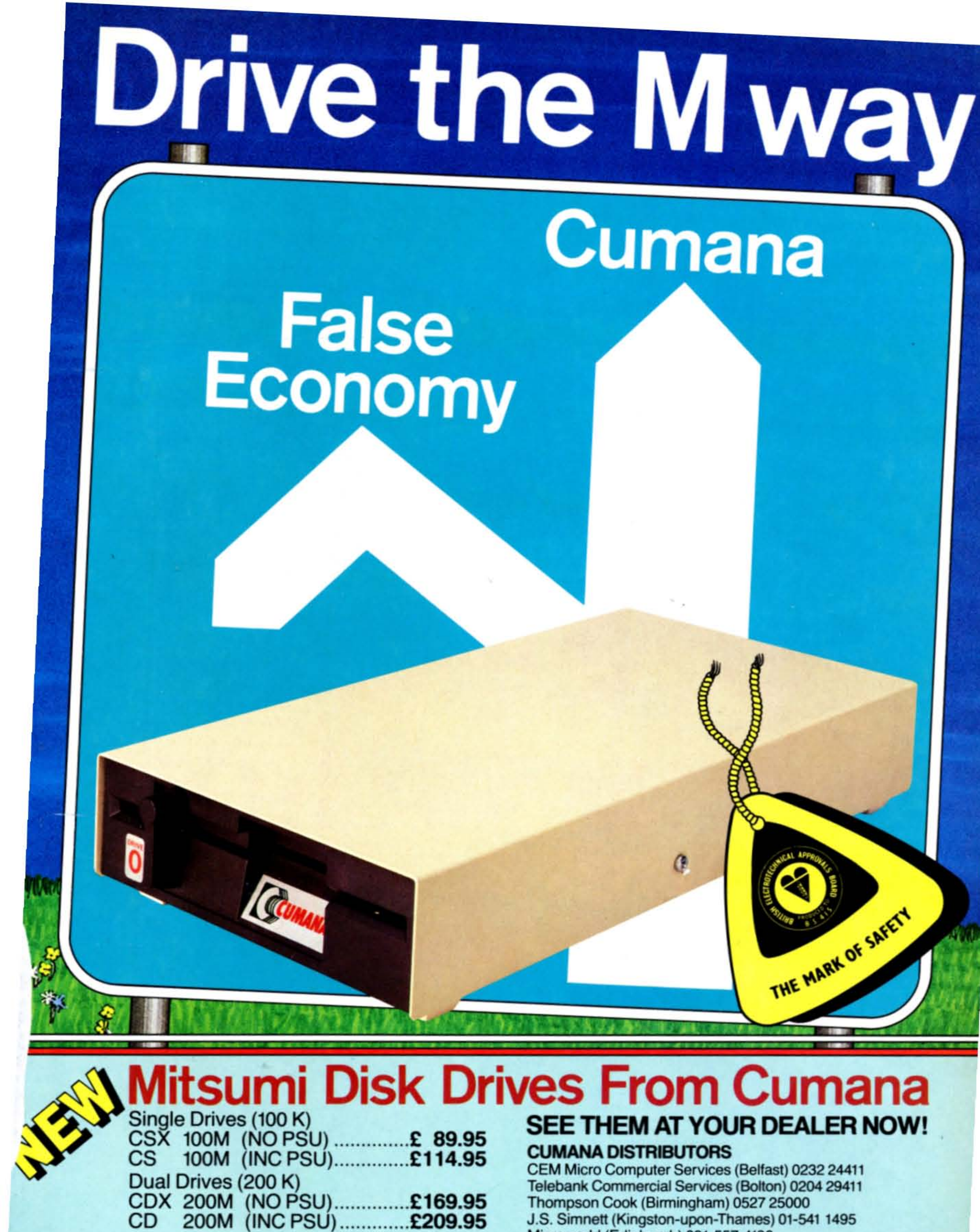
**CARRIAGE COSTS** – Micros – Monitors – Disc Drives – Printers – Desks – 2nd Processors: £7
Cassette Decks: £3. – Books – Software – Leads £1. per item.
ACCESS/BARCLAYCARD/VISA ORDERS WELCOME
**CREDIT FACILITIES** Instant credit up to £1,000, deposit 10%

*PLEASE STATE; DISK FORMAT 40 OR 80 TRACK*

Name ____________
Address ____________

Telephone ____________

MU 11


Drive the M way
Cumana
False Economy
DRIVE 0
CUMANA
BRITISH ELECTROTECHNICAL APPROVALS BOARD
THE MARK OF SAFETY

NEW

## Mitsumi Disk Drives From Cumana

Single Drives (100 K)

| | | | |
|---|---|---|---|
| CSX | 100M | (NO PSU) | £ 89.95 |
| CS | 100M | (INC PSU) | £114.95 |

Dual Drives (200 K)

| | | | |
|---|---|---|---|
| CDX | 200M | (NO PSU) | £169.95 |
| CD | 200M | (INC PSU) | £209.95 |

**SEE THEM AT YOUR DEALER NOW!**

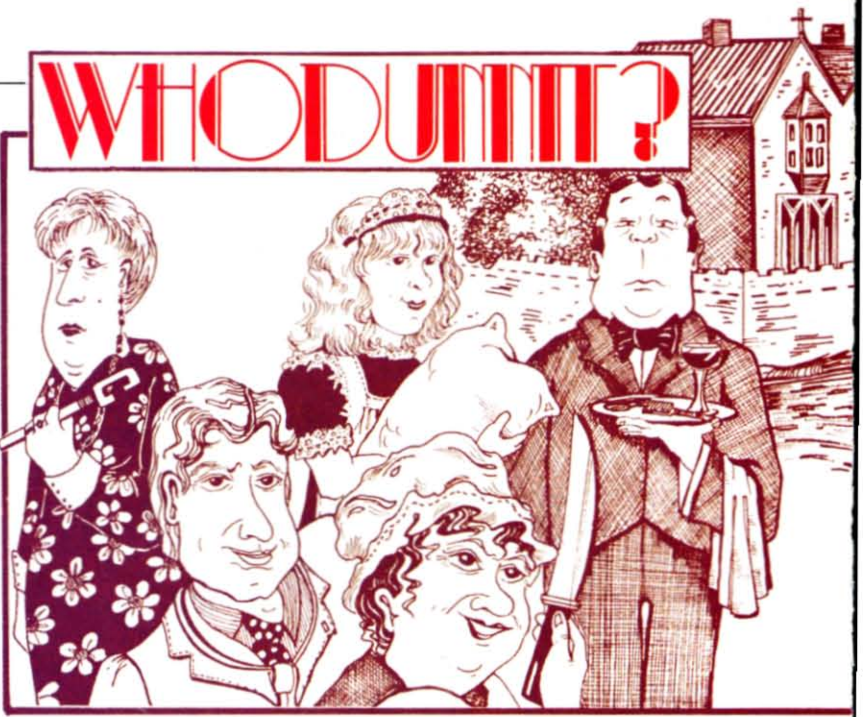
**CUMANA DISTRIBUTORS**

CEM Micro Computer Services (Belfast) 0232 24411
Telebank Commercial Services (Bolton) 0204 29411
Thompson Cook (Birmingham) 0527 25000
J.S. Simnett (Kingston-upon-Thames) 01-541 1495
Microworld (Edinburgh) 031-557-4196
Hugh Symonds (Bournemouth) 0202 26535
Eltec (Bradford) 0274 722512

CUMANA®
*The best name in memory*

Cumana Limited, Pines Trading Estate,
Broad Street, Guildford, Surrey, GU3 3BH.
Telephone: Guildford (0483) 503121
Telex: 859380

# WHODUNNIT?



**CECIL Effingham, rich landowner and Earl of Thaxford, has been found murdered at his home, Thaxford Manor. The murder occurred at around 10.30pm. You have been sent for to try to solve the crime and bring the murderer to justice.**

There you have the scenario for **Whodunnit?** an investigation game that combines logic and deduction.

You may move freely about the manor obtaining statements and searching for clues – murder weapons. To try to put you off the scent, the murderer will occasionally tell lies while all the other suspects you question will always tell the truth.

The murder was committed in one of the 10 rooms of Thaxford Manor. You have 10 suspects and 10 possible murder weapons to deal with.

Whodunnit? is a real time game. While you are trying to solve the crime, suspects will be moving around taking and replacing weapons, as yet undiscovered by you. This means you may have to search a room more than once.

In each room you have four options. If there is at least one suspect present you may either obtain a statement or accuse him or her of committing the crime.

Any statement you receive only relates to the current whereabouts of suspects and weapons and how they compare with their relative positions at the time of the murder.

If you find no one in the room, you can either leave straight away, or search for hidden weapons.

Quick searches take less time and you lose less score, but thorough searches are more successful.

Searching is an important element in the game since many statements refer to the current whereabouts of the weapons.

Until you find a weapon you have no idea which rooms are being spoken about – and the weapon is likely to be moved by a passing suspect. Once you have searched and revealed the location of a weapon, it stays in that room.

None of the suspects will make direct references to the murderer, weapon used or murder room, not wishing to be seen "grassing" to the law. However they are law-abiding citizens at heart and you occasionally receive unsigned notes telling you the whereabouts of either a suspect or a weapon at the time of the murder.

These never come from the murderer, so they are always true.

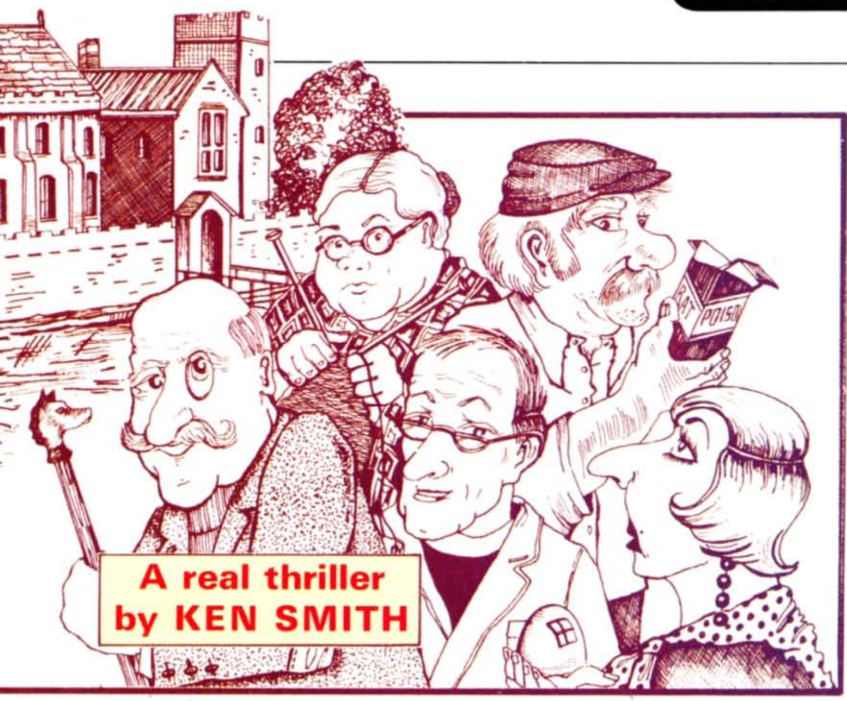
Your rank affects the type of statements you will be given. It also makes searching more difficult – your score moves down faster and suspects and weapons move about more often.

However, bonuses are greater the higher your rank.

Of the five ranks, the lowest, detective constable, allows you to solve the crime without the need of the logic sheet – see Page 70 – although it may be used to

## PROCEDURES

| | |
|---|---|
| **M** | Produces the menu page. |
| **F** | Accusations are made and tested. |
| **S** | Randomly swaps suspects and/or weapons to new rooms. |
| **H** | Move to a new room. |
| **G** | Indicates the room you are currently in. |
| **Q** | Questioning a suspect. |
| **K** | Searching a room for hidden clues. |
| **B** | Main score adjustments related to time. |
| **S** | Minor score adjustments resulting from statements being made. |
| **J** | Produces the plan of the Manor. |
| **D(c,x,y,z$)** | Produces double-height writing in any colour anywhere on the screen. c = colour. x = horizontal coordinate. y = vertical coordinate. z$ = string to be written. |
| **C** | Continues the program when spacebar is pressed. |
| **Y** | Game summary. |
| **I** | The heart of the program. This is the initialisation procedure which sets all the suspects and weapons into the two time zones – the time of the murder and now. With the help of PROCr and PROCR it also generates a completely random scenario each time, 1 out of 1000 possible combinations. |
| **r** | Randomises the locations for PROCI. |
| **R** | Produces the random numbers for PROCr. |
| **P(c,y,z$)** | Similar to PROCD(c,x,y,z$) but generates the sentences for the suspects' statements such that they do not truncate words when they reach the edge of the screen. |
| **A(R%)** | Checks the plan of the Manor to see which rooms are adjoining the room you are in or the rooms which were adjoining the suspect's previous location. |
| **N(I%,P%)** | The largest and most complicated procedure of the program is designed to bring together all the string variables in the data and turn them into meaningful, logical and – for the most part – true sentences. |
| **L** | Produces at random intervals a note with |



A real thriller
by KEN SMITH

help jot down statements.

By rank five, Chief Inspector, you will receive very few direct statements. Here the logic sheet is vital, so now a word about how to use it.

Firstly, assume every statement to be true. It helps in the long run.

Here is a situation from a game: You are in the study. Major Caine is there and you request a series of statements – usually eight will be given on rank 1. Here is what he says:

The Earl wasn't murdered by a woman. Harry the gardener was in this room. The paperweight was in the same room as me. The Earl wasn't murdered in the cellar. The silk scarf was in an adjoining room to the kitchen. The pillow was not in the kitchen. The duelling pistol has been in the same room all the time. No further comment.

From these eight statements by Major Caine, the following points can be deduced and marked on the logic sheet:

All the women may be eliminated.

On the suspect/room grid, Harry the gardener/study may be ticked and all other suspects relating to the study can be crossed, likewise all Harry's other locations.

On the suspect/weapon grid, Major Caine/paperweight may be ticked, then as for Harry/study above.

The cellar may be eliminated from statement 4.

The silk scarf was adjoining the kitchen (room 7). On the plan of the manor we see that rooms 6 (dining room), 8 (hall) and 9 (the cellar) adjoin the kitchen. On the weapon/room grid, therefore, we can cross all the other rooms for the silk scarf except rooms 6, 8 and 9.

Similarly on the weapon/room grid, we can cross that the pillow was not in the kitchen.

Finally, statement 7. Having already searched the lounge and found the duelling pistol, we now know that was where it was at the time of the murder. So on the weapon/room grid we tick duelling pistol/lounge and cross all other references to either.

Statement 8 tells us that we won't get another sentence out of Major Caine . . .

Two final points about the program itself. A downloader has been tagged on the end for disc users. If you don't have a disc machine, delete lines 50, and 4270 to 4310.

When entering the program and eliminating typing errors, disc users should SAVE the new version before RUNning it.

A space " " must be added to the end of the last DATA statement in lines 4160, 4170, 4180, 4200, 4210, 4220, 4230, 4240 and 4250. These help to stop words accidently joining up when printed on the screen.

Happy detective work . . .

information concerning the whereabouts of either a suspect or weapon at the time of the murder.

| | |
|---|---|
| **b** | Produces a sound to indicate failure. |
| **f** | Produces a simple fanfare to indicate success. |

## MAIN VARIABLES

| | |
|---|---|
| **D%** | Detective rank. |
| **H%** | High score. |
| **I%** | Person you are currently questioning. |
| **J%** | Chooses which adjoining room a statement will be made about. |
| **K%** | The killer. |
| **L%** | Killer's lie variable. |
| **M%** | Murder room. |
| **P%** | Your current position. |
| **S%** | The score. |
| **V%** | Ascertains which rooms are adjoining which. |
| **W%** | Murder weapon. |
| **X%** | Suspect you are accusing. |
| **Y%** | Room you accuse the suspect of committing the crime in. |
| **Z%** | Murder weapon the suspect used. |
| **e%** | Former room of the suspect being questioned. |
| **f%** | Weapon in the same room as *e%*. |
| **g%** | Suspect formerly in a randomly chosen room (*r%*). |
| **h%** | Weapon formerly in a randomly chosen room (*r%*). |
| **r%** | Randomly chosen room. |
| **s%** | Suspect formerly in your current location. |
| **w%** | Weapon formerly in your current location. |
| **q%** | Checks to see if you are searching a room for the second time, or more. |
| **m% n%** | Markers to check for the past and current location of suspects and/or weapons which have been detected. |
| **o%** | Checks how many people occupy the room you are in. |

From Page 69

# Whodunnit?
# LOGIC SHEET

| SUSPECTS | ROOMS | | | | | | | | | | WEAPONS | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Bathroom 0 | Bedroom 1 | Study 2 | Lounge 3 | Library 4 | Ballroom 5 | Dining room 6 | Kitchen 7 | Hall 8 | Cellar 9 | Carving knife 0 | Chain saw 1 | Duelling pistol 2 | Knitting needle 3 | Paperweight 4 | Pillow 5 | Rat poison 6 | Silk scarf 7 | Walking stick 8 | Wrench 9 |
| 0 Dr Adams | | | | | | | | | | | | | | | | | | | | |
| 1 Gregg the butler | | | | | | | | | | | | | | | | | | | | |
| 2 Major Caine | | | | | | | | | | | | | | | | | | | | |
| 3 Harry the gardener | | | | | | | | | | | | | | | | | | | | |
| 4 Reverend Jones | | | | | | | | | | | | | | | | | | | | |
| 5 Felicity the maid | | | | | | | | | | | | | | | | | | | | |
| 6 Mrs Dwight | | | | | | | | | | | | | | | | | | | | |
| 7 Beatrice the nanny | | | | | | | | | | | | | | | | | | | | |
| 8 Lady Effingham | | | | | | | | | | | | | | | | | | | | |
| 9 Isabel the cook | | | | | | | | | | | | | | | | | | | | |

| WEAPONS | Bathroom 0 | Bedroom 1 | Study 2 | Lounge 3 | Library 4 | Ballroom 5 | Dining room 6 | Kitchen 7 | Hall 8 | Cellar 9 |
|---|---|---|---|---|---|---|---|---|---|---|
| 0 Carving knife | | | | | | | | | | |
| 1 Chain saw | | | | | | | | | | |
| 2 Duelling pistol | | | | | | | | | | |
| 3 Knitting needle | | | | | | | | | | |
| 4 Paperweight | | | | | | | | | | |
| 5 Pillow | | | | | | | | | | |
| 6 Rat poison | | | | | | | | | | |
| 7 Silk scarf | | | | | | | | | | |
| 8 Walking stick | | | | | | | | | | |
| 9 Wrench | | | | | | | | | | |

## NOTES

The murderer *occasionally* lies. Adjoining rooms are those linked by doorways.

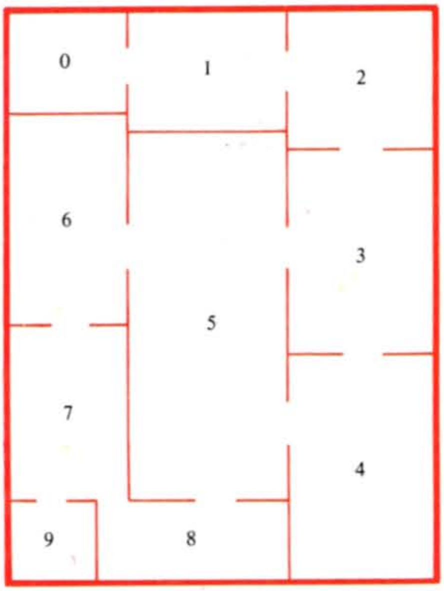
Each suspect and each weapon was in a *different* room at the time of the murder.

Statements only relate to the *current* whereabouts of weapons and suspects. Until found, weapons may be moved about the Manor as the suspects move around. Once found they remain in that same room.

Elements Eliminated.

| | | | | | |
|---|---|---|---|---|---|
| 0 Dr Adams | ☐ | Carving knife | ☐ | Bathroom | ☐ |
| 1 Gregg | ☐ | Chain saw | ☐ | Bedroom | ☐ |
| 2 Major Caine | ☐ | Duelling pistol | ☐ | Study | ☐ |
| 3 Harry | ☐ | Knitting needle | ☐ | Lounge | ☐ |
| 4 Reverend Jones | ☐ | Paperweight | ☐ | Library | ☐ |
| 5 Felicity | ☐ | Pillow | ☐ | Ballroom | ☐ |
| 6 Mrs Dwight | ☐ | Rat poison | ☐ | Dining room | ☐ |
| 7 Beatrice | ☐ | Silk scarf | ☐ | Kitchen | ☐ |
| 8 Lady Effingham | ☐ | Walking stick | ☐ | Hall | ☐ |
| 9 Isabel | ☐ | Wrench | ☐ | Cellar | ☐ |

PLAN OF THE MANOR



Cecil Effingham was murdered by ______________________

in the ______________ using the ______________________

Detective rank __________ Score ______________________

*Teachers will find it helpful to photocopy this page for classroom use.*

Full listing starts on Page 161

# "YOUR PROGRAMS ALWAYS REACH ME BEFORE ONES ORDERED LOCALLY"

(I. Sinclair, N.S.W., Australia)

**WE ALWAYS TRY TO SEND YOUR PROGRAMS ON THE SAME DAY WE GET YOUR ORDER, THAT'S WHY IT'S CALLED SPEEDYSOFT! All programs normally in stock before we advertise them! FOREIGN ORDERS WELCOME, satisfied customers in 64 countries over 3 years. UK prices include VAT: export prices are the same, plus p&p because of the extra work involved. Pay by sterling cheque, bank draft or postal order. All orders must be prepaid: we send your programs as soon as we get your money!. It's fastest to order by phone from any country with your VISA, EUROCARD, MASTERCARD or ACCESS. Call 01-846 9353, 24 hrs, 7 days a week. BIG FREE ILLUSTRATED CATALOGUE WITH EVERY ORDER WITH DETAILED REVIEWS, LOAD TIMES, ETC. Includes lots of classic serious software, too. Send £1.00 cash (refunded with first order) for catalogue only. FREE GIFT if your order from this ad comes to £30! See last paragraph.**

**ENTHAR SEVEN** *"I DOUBT THAT A BETTER GAME HAS BEEN WRITTEN ... Almost certainly the biggest adventure ever written for the machine ... the quality of the text is extremely high and the puzzles very satisfying - varied and challenging, but fair and logical." (ABComp)* Over 100K of text: 450 locations: 80 objects: 1200 messages. All m/code. Dual drives OK. All objects on Enthar Seven have a purpose. No Stick. Helpcard, instruction book, notebook. (Robico) **40 Track, 2 disks, £17.95 80 Track, 1 disk, £16.95**

**BOFFIN** *"Boffin is beautiful and everyone deserves a go ... The graphics are the best I've seen on a platform game for the BBC ... a faultless piece of programming design." (ABComp) "One of the few arcade games released recently to make Spectrum owners envious." (PCW)* Two different versions of the game on the same tape: one has 25 screens, the other 20 new ones. Your umbrella is useful. Enjoy your ride on a Tarantula's back! (Addictive) **Cassette £9.95**

**MATCH DAY** *"Far superior to any other ... the reality of the whole match, with the reflection as the ball bounces and the quality graphics, make this a worthwhile buy." (ZXComp) "Must be the definitive football game ... this one has the best graphics, playability and atmosphere." (Crash)* Good 3D graphics: play over many skill levels and time periods. Sticks OK. (Ocean) **Cassette £9.95**

**JUMP JET** *"Combines not only the challenge of coping with a flight simulation, but also the thrill of combat ... it's fairly easy to get airborne, but the rest of the mission is very challenging." (C&VG)* Fly your own jump jet in combat. Good tunes, great graphics, very clear instruments, intelligent use of split-screens. Sticks OK. (Anirog) **Cassette £9.95 Disk (40 Track only) £11.95**

**HACKER'S HANDBOOK** *"The ethics aside, a very good read ... clear and uncomplicated ... Well worth buying." (ZXComp)* Takes you from the first steps, how a modem works, what equipment you need, through to dialling publicly listed computers. Shortwave radio hacking, too. Century Paperback, 150 pages. Order as **'Hackbook': £4.95**

**BANJAX** *"The graphics are superb ... all the locations are beautifully drawn and virtually every screen is different ... I strongly urge you to buy this game." (ABComp) "Some of the best Mode1 graphics I have ever seen ... a definite must." (MicUsr)* 240 locations in this m/code arcade adventure. On-screen hints as you get exploring. Help card, notebook. No Stick. (Robico) **Cassette £9.95 Disk (State 40 or 80 track) £11.95**

**INTER SHEET** *"Quicker, has more features and is cheaper than either of its competitors." (ABComp)* The spreadsheet ROM in a new series of ROMS which, although working independently, are also able to talk to each other. Claimed to be the most powerful and flexible ROM-based spreadsheet for the Beeb. 6502 compatible. Wordwise/View compatible. All usual functions, plus 40/80/105 column display. Menu-driven. **ROM Recommended price £56.35 OUR PRICE £50.00**

**INTER CHART** Allows practically any data (including Inter Sheet data) to be presented graphically.6502 compatible. Enter data from keyboard or file. Pies, bars, lines. Completely auto-scaling. Epson-compatible screen dumps included. Provision for dumps to other printers.OM Recommended price £36.80 Our price £33.00

**REVS** *"After the magnificent ELITE we now have another winner, Revs. Graphically, it is excellent. It feels like driving a real racing car ... oozes class, style and, above all, realism ... one of the best simulations ever." (PCW)* Sticks OK (Acornsoft) **CASSETTE £14.95 DISK (40/80 track OK) £17.65**

**NEW REPLAY ROM** *"THE BEST FORM OF TRANSFER I HAVE MET ... I have nothing but praise to lavish upon it." (PCT) "An unusual device that promises to be a boon for disk-using games fans." (Beebug)* 100% effective in tape/disk transfers. Even loads a stopped screen for printing. Disk to disk transfers. Midplay stop-and-save. (To upgrade existing TD ROM contact Vine.) Please order by type no: according to your DFS: TYPE 8271 for Acorn DFS, Acorn DNFS, AMCOM S/D, WATFORD S/D. TYPE 1770 for OPUS DDOS 3.45 & SOLIDISK DDOS: TYPE 2791 for Opus 3.15. (Vine) **REPLAY ROM £35.00**

**BEACH HEAD** *"A multi-screen arcade game that is very close to being perfect ... graphically it is astonishing ... a vast number of features." (PCW)* A whole war on one tape! At last the famous Commodore/Spectrum program runs on your Beeb. 6 battles each require a different survival strategy. 1 or 2 players. 3 skill levels. Sticks OK. (U.S.Gold) **Cassette £9.95**

**RED MOON** Text only but, as you would expect from Level 9, some of the best-written text around. You must use many weapons and spells as you collect the 9 treasures and find the Red Moon Crystal. No Sticks. (Level 9) **Cassette £6.95**

**BBC MUSIC SYSTEM** *"The best music software package for the Beeb, using the internal soundchip, that I have ever seen." (Beebug) "It is difficult to imagine a more comprehensive musical program." (ABComp)* 76-page illustrated manual. But the 4-page leaflet has you watching one of the pre-recorded tunes play within 2 minutes. Then you start to adapt it... No Stick. (Island Logic) **2 Cassettes £29.95 2 Disks (40/80 track) £29.95**

**WORDWISE + ROM** The greatest BBC word processing ROM. 180-page manual. 56-page manual. Keystrip. Typing tutor. Example text. Example programs enable mailmerging, index generation. COMPATIBLE WITH EXISTING WORDWISE FILES and with 6502 2nd processor. (Computer Concepts) Recommended price £56.35 **OUR PRICE £50.00** SAVE £6.35

**FREE TAPES DISKS** **If your order from this ad comes to more than £30 (excluding p&p) we will send you 2 free 15min blank data tapes or 1 free 5.25 inch disk. Indicate which on your order!**

VISA
ACCESS

## SPEEDYSOFT

01-846 9353 (24 HRS)

EUROCARD
MASTERCARD

**POST TO: SPEEDYSOFT** (MU12)
**37 CHURCH ROAD, LONDON SW13 9HQ, ENGLAND.**
For CATALOGUE ONLY, send £1 cash. Refunded with your first order.
I own a BBC 'B'/BBC 'B' PLUS. I enclose a cheque/PO payable to Speedysoft OR charge my VISA/ACCESS/EUROCARD/MASTERCARD

No. ☐☐☐☐ ☐☐☐☐ ☐☐☐☐ ☐☐☐☐

Signature: ________ Expiry Date ________
Please write clearly. If we can't read it, you won't get it.
Name: ________
Address: ________
________
________ Postcode: ________
PHONE NO: if any, in case of query ________

| Program Name | Cass/Disk | Price |
|---|---|---|
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| Postage & Packing | UK add 75p per order | |
| | Europe ADD £1.00 per program | |
| | Outside Europe ADD £1.50 per program | |
| | Total Order | |

# Electronequip

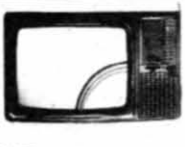
**(Authorised BBC Micro Dealer, and Econet service centre)**

## SOFTWARE SALE

most **ACORNSOFT £2.99** inc VAT
most **OTHERS £1.99** inc VAT

**Catalogue available**

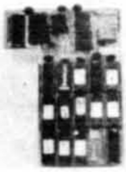
**NORDMENDE**

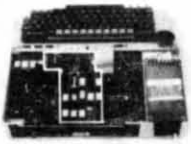


14" TV/Monitor
**£199** inc VAT
Remote version **£229.95** inc VAT
Offer includes RGB/BBC cable.
Green Screen Monitor **£69.00** inc VAT
Buy this superb TV/Monitor from the original distributors (since Sept '82)

**SIDEWISE** **SIDEWISE FITTED**

A T P L





A T P L

"SIDEWISE" rom board for BBC Micro.
No soldering required **39.33** inc VAT

### BBC Micro SPARES

| | | | | | | |
|---|---|---|---|---|---|---|
| Keyboard | 49.85 | Keystrip | 1.99 | Speaker | 2.99 | ALL INC. |
| Power Supply | 49.95 | Case | 19.99 | Keyswitch | 2.30 | VAT |

NEW

## 40/80 Track Drive Switch

Plugs into disc interface, converts most 80 track drives into 40/80 track units. No more disc errors for wrong discs.
Introductory price .......... **19.95 inc.**

## 100% BBC Compatible High Quality, Half-Height Disk Drives

| | |
|---|---|
| Double-sided 800k (2 x 400k) (40/80 track switchable) | 329 inc. |
| Double-sided 400k (single) (40/80 track switchable) | 149 inc. |
| Single-sided 100k (40 track) | 99 inc. |
| Boxed DS/DD 96tpi Discs | 23.69 per box |
| Boxed SS/SD 48tpi Discs | 18.63 per box |
| Memorex 96tpi DS Discs | 25.90 per box |

**BRANCHES**

**MAIL ORDER: 36-38 WEST STREET**
**FAREHAM, HANTS. (0329) 230670**
**SHOP/TECHNICAL: 59 WEST STREET**
**FAREHAM, HANTS. (0329) 230671**
**KINGS LYNN: 17 TENNYSON AVE.**
**(0553) 773782**

## VOLTMACE JOYSTICKS

10% off list prices

| | Discounted price inc VAT |
|---|---|
| Voltmace Delta 14B Joysticks | 13.46 |
| Voltmace 14B/1 Adaptor Box | 13.36 |
| Voltmace Delta 3B Twin Joysticks | 17.99 |
| Voltmace Delta 3B Single Joystick | 11.95 |

**DISC BOXES**

| | |
|---|---|
| 30 Disc Box | 6.90 |
| 40 Disc Box | 13.80 |

**DUST COVERS**

| | |
|---|---|
| RX80F/T | 5.24 |
| FX80 | 5.29 |
| KP810 | 4.60 |
| BBC Micro | 4.14 |
| Microvitec | 6.09 |
| PW1080A | 4.60 |

**EPROMs**

| | |
|---|---|
| 2764 | 2.49 |
| 27128 | 3.89 |

**LISTING PAPER**

11 x 9.5" with micro perf's ... 7.50 per 1000

## PRINTERS

## KAGA KP810

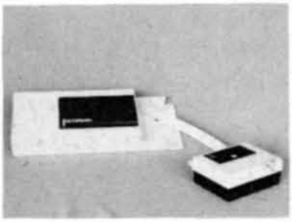
## 289.00 inc VAT

| | |
|---|---|
| **EPSON FX 80** | **377.20 inc** |
| **BROTHER HR-15** | **399.00 inc** |
| **SEIKOSHA SP-1000** | **249.00 inc** |

Printer Price includes paper & BBC cable
Screen dump rom available for **£11.50** inc VAT

**Just a selection. Phone for details of full range**

**3 Colour Plotter with utilities 399.00**



**59.50** **89.97**

**All prices inclusive of VAT.**
Prices subject to variation without prior notification
All offers subject to availability
TRADE, EDUCATIONAL & HMG ORDERS
(Phone for discounts)
Large Stocks – 24 Hour Despatch
Securicor 4.90 (per parcel) inc. VAT
Postage 46p (per item) inc. VAT

**Phone for comprehensive catalogue**

VISA

**MAIL ORDER ENQUIRIES TO BELOW OFFICE**

ACORN COMPUTER

# Electronequip

**36-38 West Street, Fareham, Hants (0329) 230671**

Torch Computers

# Taking the classical route to a mini adventure

### By ALICE

**A NUMBER of readers are curious as to how I design a mini adventure. Often they are modifications of classic puzzles, some of which were invented by either Henry Dudeney or Sam Lloyd over 100 years ago.**

These two published scores of problems that were later shown to have a deeper mathematical significance. An example is if N>2, then all the squares of an N*N chessboard can be visited by a chess queen in 2*N-2 moves.

It was not until 1955 that it was proved that, providing N>5, then the queen's tour can also be cyclic – that is, she can begin and finish in the same square.

Dudeney first presented a version of this puzzle in contemporary terms circa 1880 by asking his English readers to ram all 49 boats in a 7*7 array in just 2*7-2=12 straight lines (see Figure I).

Sam Lloyd went one better by asking his American readers to cover the 8*8 branch in 2*8-2=14 queen moves. Lloyd was the first to solve this version and considered it one of his best efforts.

A number of adventures require the player to move correctly around mazes using only the eight compass directions. There is an 8*8 chequerboard puzzle in Castle Blackstar and the spider web in Quondam (last month) both of which require understanding before the correct moves can be worked out.

I have updated Dudeney's classic to just picking up all the objects in an N*N array (see Program I). Usually I just give the listing without any explanation – just "All you have to do is make it STOP".

This lack of background makes the puzzle doubly difficult – you have to "read" the program to work out the question – but many adventure puzzles are only baffling because the player fails to recognise what is required.

In order to test my program, first solve the well known N=3 case. That is, picking up nine objects in a 3*3 array in the following 2*3-2=4 moves:

1: E,3
2: NW,3
3: S,3
4: NE,2

The prize goes to the first who can stop the program when N=5 and N=7 AND then decode the unique time and place given in Figure II. Caveat – I won't be there.

I have not set Sam Lloyd's N=8 case in 14 moves because it is much too difficult. It took him months to get just one solution which is:

1: E,7
2: N,7
3: SW,5
4: E,4
5: NW,5
6: S,4
7: NE,4
8: W,3
9: SE,4
10: N,4
11: SW,6
12: E,6
13: NW,6
14: S,7

There are other cyclic tours in 14 moves but I know of no other that uses only queen moves.

```
   10 DIM B(10,10)
   20 INPUT "SIDE = ",N
   30 REPEAT
   40 FOR Y=1 TO N:REM DROP N*N OBJEC
TS
   50 FOR X=1 TO N
   60 B(Y,X) = 1
   70 NEXT X
   80 NEXT Y
   90 X=1             :REM START BOTT
OM LEFT
  100 Y=1
  110 OBJ=0
  120 FOR M=1 TO 2*N-2:REM NO. OF MOV
ES
  130 PRINT M;
  140 INPUT ":DIRECTION,DISTANCE ",D$
,D
  150 FOR S=1 TO D
  160 IF INSTR(D$,"N")>0 THEN Y=Y+1
  170 IF INSTR(D$,"S")>0 THEN Y=Y-1
  180 IF INSTR(D$,"E")>0 THEN X=X+1
  190 IF INSTR(D$,"W")>0 THEN X=X-1
  200 IF B(Y,X)=1 THEN OBJ=OBJ+1
  210 B(Y,X)=0
  220 NEXT S
  230 NEXT M
  240 PRINT"YOU GOT ";OBJ;" OBJECTS I
N ";2*N-2;" MOVES"
  250 UNTIL OBJ=N*N AND (N<6 OR(X=1 A
ND Y=1))
  260 PRINT"YOU DID IT!":END
```

*Program I: Picking up all the objects in an N*N array*

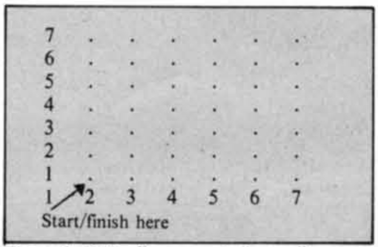
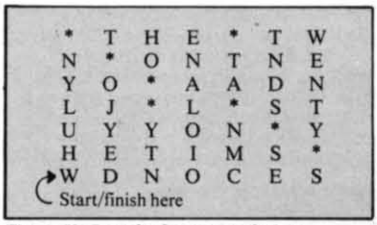


*Figure I: Visit all squares in "queen" moves*



| | | | | | | |
|---|---|---|---|---|---|---|
| * | T | H | E | * | T | W |
| N | * | O | N | T | N | E |
| Y | O | * | A | A | D | N |
| L | J | * | L | * | S | T |
| U | Y | Y | O | N | * | Y |
| H | E | T | I | M | S | * |
| W | D | N | O | C | E | S |

Start/finish here

*Figure II: Decode the time and place*

# INFORMATION PROCESSING ON YOUR BBC COMPUTER!

## WHY SHOULD THE BIG BOYS GET ALL THE INTEGRATED SOFTWARE?

**For serious users of the BBC computer. Disc machines only.**

What the reviewers say:-

*DATASCRIBE IS BRILLIANT VALUE FOR MONEY—*

John Vogler, A & B Computing, Sept 1985.

*I SHALL USE SCRIBE FOR MOST OF MY WRITING—*

John Dawson, Your Computer, Feb 1985.

## SCRIBE £59.95

THE PROFESSIONAL WORD PROCESSOR designed for the serious user • All operations fully prompted • No special knowledge of the computer system necessary • Document size NOT limited by computer memory • Automatic disc buffering ensures text is moved between disc and computer memory without user intervention • Up to 255 pages in a single document • 80 column display • On screen underline and right justify • See it as it will be printed. SCRIBE comes in a chip with 5 minute fitting instructions, utilities disc and manual. Integrates with Database.

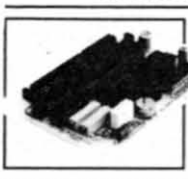
## DATABASE £49.95

A superb record keeping system with an incredible operating speed. 96 fields per record • One record 2 Kb max • One field 900 characters max • 4000 records per database • 16 level conditional search • Record match • 8 automatic sub indexes • Total flexibility of output via report writer with ability to write back to the database • Maths pack • Semi programming language plus compiler. Integrates with Scribe to give conditional search with MAIL MERGE and high powered report formatting. Comes in ROM.

## DATASCRIBE £95

Scribe & Database in a single chip! Contains all the features of both products and with an attractive saving on price and ROM space.

## DOUBLE-DOS £59.95



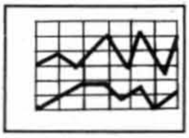
Double density disc interface. A high capacity database or word processor is enhanced even further with this state of the art disc interface. The many features include • 720 Kb of CONTINUOUS file space on a standard 80 track disc drive • Automatically read standard Acorn files • Compensate for discs formatted in single density • Provide up to 159 files IN ONE DIRECTORY • Automatically read, write and format double sided drives to appear as one disc surface • Allow maximum use of MERTEC Scribe and Database. Very easy fitting — no soldering — full instructions provided.

## SCRIBECHEC £24.95

**TYPING/SPELLING CHECKER.**

The fastest typing checker available. • 7200 word base dictionary in ROM plus room for your own 15,000 (approx) word dictionary on disc • Any number of dictionaries • Maintenance includes add and delete, list words between alpha limits and many more features • Check speed 1500 words per minute! • Any document length. Also available for wordwise & view.

## DATASTAG £59.95 (COMING SOON)



**STATISTICS AND GRAPHICS PACKAGE. (ROM BASED)**

Coming soon. A highly professional system which integrates with Database. Allows you to store your data in any format and, using Database, present all or selected items of data for graphing and statistical analysis • Graphs include Pie, bar, histograms, line plot, scatter plot • Display between one and four graphs simultaneously • Automatic scaling and direct digital readout of graph co-ordinates • Statistics include all standard tests plus linear regression and correlation etc • seven non-parametric tests • Epson screen dump included with facility to add your own printer dump.

## SCRIBE ASSEMBLER £24.95

Use Scribe as a super editor for the assembler. A powerful and professional package that will assemble standard 6502 source code plus many of the non-standard mnemonics from the BBC Basic's own assembler. NOTE — Scribe is required to use the assembler.

## MINI ROM BOARD £14.95

Provides four extra ROM sockets. Easy fitting and without any of the overheating and space problems associated with large expansion boards.

### *SPECIAL COMBINED PACKAGE OFFER*

| | |
|---|---|
| Datastag & Database (in one chip) 1 | **£95.00** |
| Datascribe & Double-Dos 2 | **£139.00** |
| Datascribe & Scribechec & Datastag — fitted to the Mini ROM Board 3 | **£165.00** |

**Prices include VAT. Add 60p post and packing to your order.**
**Dealer and education enquiries welcome.**

Purchasers of MCP software are provided with a free update service and an unmatched level of technical support. (Updates subject to postal charge.)

//Mertec

**MERLIN COMPUTER PRODUCTS**

Please supply the following products/information. Please tick box.

| | | | | |
|---|---|---|---|---|
| SCRIBE ☐ | QTY | ______ | £ | ______ |
| DATABASE ☐ | QTY | ______ | £ | ______ |
| DATASCRIBE ☐ | QTY | ______ | £ | ______ |
| DOUBLE DOS ☐ | QTY | ______ | £ | ______ |
| SCRIBECHEC ☐ | QTY | ______ | £ | ______ |
| DATASTAG ☐ | QTY | ______ | £ | ______ |
| SCRIBE ASSEMBLER ☐ | QTY | ______ | £ | ______ |
| MINI ROM BOARD ☐ | QTY | ______ | £ | ______ |
| SPECIAL COMBINED PACKAGE 1 2 3 | QTY | ______ | £ | ______ |
| | | TOTAL | | ______ |

I enclose £ Inc P&P
My credit card No. is
Visa ☐ Access ☐ Tick which

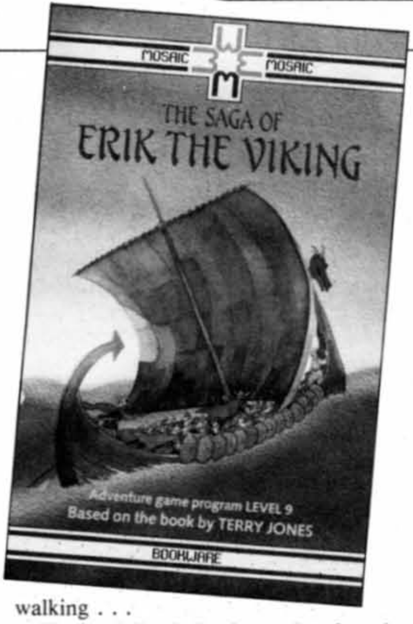
Name ______________________

Address ______________________

To: **MERLIN COMPUTER PRODUCTS**
33/36 Singleton Street, Swansea SA1 3QN. Tel: 0792 467980

**IMPORTANT NOTE:** Please check with us if you decide to use any other disc interface than Acorn or Double-Dos with Scribe or Database.

# Yo, ho, ho with the Vikings


MOSAIC
MOSAIC
THE SAGA OF
ERIK THE VIKING
Adventure game program LEVEL 9
Based on the book by TERRY JONES
BOOKWARE

**ERIK the Viking** (Mosaic Bookware) leapt ashore and turned to his trusty, lusty crew. "Bjorn – Burn", he said, "Peer – Pillage". Oh no", groaned Ragnar Forkbeard. "I've got a headache".

Since this game is implemented by Level 9 you'll find even worse jokes than that. Half the crew munch buttered fish, so I thought a visit to the viking loo, clutching some silver, would be essential – it is but don't spend a penny since the loo is "just scenery" and the nearest bog is in Ireland.

The nice gimmick of this game is that many of the places that you can visit actually did exist around AD 900 and you have to explore a great deal of the North Sea and the North Atlantic in your search for Erik's kidnapped family.

In order to search the high seas you need help to launch your ship. After that you're better off on your own because the crew are as useless as old Oakenshield in the Hobbit.

They also sing of gold, fall asleep, look worried, mutter darkly, tell you to "Hurry up" but do nothing useful. They finally tear the sail by tugging it once too often and you have to make all repairs. If only the planks were made for walking . . .

The last Mosaic Bookware I reviewed was The Pen and the Dark, where you got the whole story. Here you only get extracts from the book by Terry Jones (of Monty Python) but this is enough to give an idea how to solve some of the puzzles.

If you get stuck you can get the usual Level 9 hint sheet. I'm not too keen on graphical adventures – they always cut into the text – but these pictures are about the best I've seen and must appeal to the younger player.

Older, more experienced Level 9 fans will probably enjoy mapping the rather desolate ocean and then making recognisable landfalls, one of them in the South of England – near Hindover Hill?

There is just a touch of déjà vu at the final riddle: "What does a rich man want that a poor man has?"

# The castle is tricky, but fair

CASTLE Blackstar (CDS Software) has a twisty maze almost immediately.

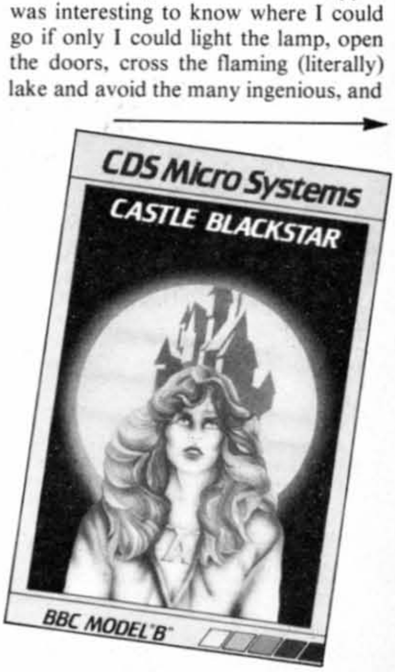
I collected five objects from elsewhere, SAVED, dived into the maze, mapped it (this requires persistence in order to move in some directions) got to the witch's gingerbread house and in nice time to be killed flagrante delicto taking her broomstick – but aren't adventurers supposed to be sticky fingered?

Resurrected with rien so RESTORE – and everything including locked doors, had disappeared. Such "features" always intrigue me.

Another funny was that I didn't need a lamp, so I mapped a lot of the game – this is quite tricky since the castle is three dimensional and some routes are on top of others – without having to solve a single puzzle.

A bit lonely though. I felt rather like the loser in a game of Sardines. Or was it BO, since the only sign of life was a dwarf who ran off whenever I got near? Answer: I had the wrong version.

So when I got the amended copy it was interesting to know where I could go if only I could light the lamp, open the doors, cross the flaming (literally) lake and avoid the many ingenious, and



# French adventurers have their problems

*ERIK doesn't quite make it to France, but I did recently. They are still way behind with "chez cultivée" adventures, probably because the syntax of French is so complex, what with feminine fenêtres (windows) and nonsensical reflexive verbs.*

*In order to find out what something is we say EXAMINE, but they have to say "Que'est que c'est que ça veut dire?" which translates as "What is it that this (object) is trying to say?" As the object is often inanimate it usually says very little. Possibly a broken tape recorder makes some sense.*

*Je geste? Pas de tout. Par example (from TILT August 1985): "Je suis au bord du volcan in Forest at World's End et bloque – Au secours".*

*Solution: "Il faut accrocher la corde (TIE ROPE) avant d'y descendre (CLIMB DOWN ROPE). Au fond du cratère se trouve un coffre, qu'il est tout a fait conseille d'emporter avec soi (GET CHEST) et de remonter (CLIMB UP ROPE)".*

*From Page 75*

now operational traps.

Although slightly dated, this is a well planned medium-to-hard game with plenty of text, good atmosphere and about 20 tricky but fair puzzles.

Good value for the money.

# Get that vampire in a spin

LAÇ Dracula, last month's problem, was a simple program that shows how to calculate bearings and distance from a fixed point, the centre of the lake. In the original the vampire could run at exactly four times the speed of the rower and the solution is to row in a spiral until you are 500 feet from the centre and the vampire is on the opposite (furthest) shore.

You then have to cover only 1500 feet while Dracula has to run PI*2000 feet – that is, over four times further.

I modified this so that V moves, at most, 10 degrees per move, simplified the bearings you can choose, complicated the starting point and where you can make a safe landing, and threw in the Black Hole for those foolish or curious enough to row immediately south. (In line 10, by the way, 40 should have been 140.)

A solution is SE, SW, SE, SW (doglegs to partly avoid the Black Hole) then S until you are 82 feet south of the centre on a bearing of 180. You can now rest (type R) until the vampire has galloped round to your new bearing.

Now move N, NW, NE, NW, NE, NW, NE and the vampire moves to bearing 160, so row like a bat out of hell on a bearing of not less than 30, otherwise you can't land safely because the shore is too muddy.

Duneroamin, our ongoing adventure first mentioned in *The Micro User* in March 1985, was first published as Exploring Mount Neverest 100 years ago by Dudeney from an idea by H.F. Heath. It was then modified into a circumnavigation puzzle by Martin Gardner and programmed by me.

Despite its age, this classic was not solved until I prodded Steven Chmiel, who then produced the same answer as Heath and myself. Therefore it appears that there are only two solutions.

Actually working it out is far more interesting than typing in the 111 moves without understanding. However, should you want to do just that, send an SAE for the moves.

As a bonus, I will also append the name of the person who made that obscure quote, read by millions, that nobody – except me – seems to remember. It's in Chapter II as I recall, but my memory is not very good . . .

FOR CONNOISSEURS
OF ACTION, LEISURE OR LEARNING
BBC Electron

**ANSWER BACK Sports Games £9.95**
(ages 14 and over)
Challenge the KOSMOS team at football or tennis. But be warned, we don't lose easily...
*- NEW RELEASE Whatever your sport, this program probably knows a lot more than you do!*

**ANSWER BACK Junior £9.95**
(ages 6 to 11)
Defeat the dragon and save the princess of KOSMOS Castle...
*- a superb program with vast potential...(A & B Computing, November 1984)*

ANSWER BACK
SPORT
QUIZ
IDENTIFY EUROPE

**ANSWER BACK Senior £9.95**
(ages 12 and over)
Outwit the KOSMOS robot and destroy the alien invaders...
*- superb program... (Personal Computing Today, October 1984)*

**IDENTIFY EUROPE £7.95**
(for all ages)
Solve the European jigsaw puzzle by land or sea...
*- NEW RELEASE Discover Europe without leaving your home!*

**40 or 80 Track Disc versions available – Add £1.00**

The IDENTIFY EUROPE program provides a fascinating way of discovering and learning the geography of Europe. The program will provide hours of amusement for all the family and everyone is sure to benefit from it.

The ANSWER BACK series needs little introduction. Each program combines a massive wealth of information with a fascinating and compelling game. The Senior and Junior quizzes each contain 750 questions and 3000 optional answers on General Knowledge. The Sports program is even larger containing a mind-bending 800 questions on Sport and two high-speed machine code games – Football and Tennis. But that's not all. For quiz fans, full facilities are provided for creating and saving new quizzes or modifying those supplied – and you don't need to be a programmer!

KOSMOS SOFTWARE LTD
1 Pilgrims Close, Harlington, DUNSTABLE, Beds. LU5 6LX
Tel: (05255) 3942

KOSMOS
S·O·F·T·W·A·R·E

**Send for details on FACTFILE 500, 20 fascinating titles, each £3.95.**

Please supply the following programs for the BBC/Electron computer

ANSWER BACK Sport @ £9.95 ☐ ANSWER BACK Junior @ £9.95 ☐
IDENTIFY EUROPE @ £7.95 ☐ ANSWER BACK Senior @ £9.95 ☐

Mr/Mrs/Miss ..........................................................
Address ..........................................................
.......................................................... Postcode ....................

Orders are normally despatched within 48 hours

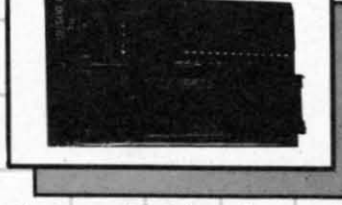
KOSMOS SOFTWARE LTD. 1 Pilgrims close, Harlington, DUNSTABLE, Beds. LU5 6LX Tel. (05255) 3942

NUMBER 1

# A MEGABYTE MARVEL OFFER FROM OPUS

ONLY **£199.95**

PHONE
NOW FOR
AUTUMN PRICE
OFFERS
AND GENEROUS
EDUCATION
DISCOUNTS
0737 65080



Here's a great opportunity to own Britain's number one disc upgrade for the BBC micro, a 'Megabyte Marvel' combining double density interface and powerful 5¼" disc drive for only £199.95.

In the latest major test of five leading disc interface systems for the BBC computer, the Opus DDOS won the honours yet again. A & B Computing magazine placed it ahead of all the rival interface offerings. As the reviewer explained:

> **"My personal choice is still the Opus DDOS, basically for its flexible catalogue system and the additional commands which go with it."**

Now you can share in our success with a red hot summer sale offer featuring our DDOS and a 5¼" double sided 80/40 track, hardware switchable disc drive to give you a one megabyte system* for an amazingly low £199.95.

The Opus DDOS provides utilities on ROM including format and verify, offers tape to disc transfer, automatic 40/80 track selection, automatic density selection, has a unique mass copy routine and powerful machine code operating system giving up to 248 files, and it's 80% faster than single density. It's compatible with Clares 'Replica II', 'Mini-office', 'Elite', 'View', 'Wordwise' and 'Wordwise+' and with most sideways ROM cards.

To order your Megabyte* system – DDOS and Opus 5802 disc drive – just post the coupon or call us on 0737-65080 quoting your credit card number.

## OPUS SUPPLIES – BRITAIN'S LEADERS IN DISC DRIVE INNOVATION

*Unformatted capacity

## OPUS SUPPLIES THE DRIVE

The Opus disc drive range has few rivals for quality, reliability and sheer value for money. We've taken the best in Japanese disc drive technology and backed it with Britain's longest guarantee – an amazing two years. Now as part of our great summer sale you can buy our highly praised DDOS for just £49.95 when you purchase any Opus 5¼" disc drive. Our drives are all half-height and they're available from our nationwide dealer network.

For full details of our extensive disc drive range and your nearest dealer call us on 0737-65080 or simply post the coupon below.

To: Opus Supplies Ltd,
55 Ormside Way, Holmethorpe Industrial Estate, Redhill, Surrey.

Please rush me the following: (PRICES INCLUDE VAT AND CARRIAGE)

____ Megabyte Marvel(s) – DDOS+5802 Disc Drive at £199.95 each
____ Dual Megabyte offer – DDOS+5802DB Dual Drive at £399.95 each

I enclose a cheque for £__________ or please debit my credit card account with the amount of £__________

My Access ☐ Barclaycard ☐ no. is: ☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐
(please tick)

Name__________

Address__________

Telephone__________

MU11

**Opus.**
Opus Supplies Ltd

BFJ RSY HHH

*ALL SOFTWARE NOW AVAILABLE ON 3'' DISKS*

# CHALICE

SOFTWARE/HARDWARE

ASK ABOUT B+ COMPATABILITY

# the SCYTHE

## THE SCYTHE TOOLKIT

If you can't see the wood for the trees, get the **Scythe** and **Hack** your way through! This ROM contains 26 useful commands, and has the added bonus of accepting HEX, DECIMAL, BINARY and resident INTEGER variable entry. The ROM commands can all be preceded with a "Y" and there are inbuilt ROM management routines to help avoid conflict with other ROMs. Supplied with comprehensive manual.

| | |
|---|---|
| **MDIS**: | A fast Up/Down scrolling disassembler which will examine all paged ROMs. Will work in any 40 or 80 column mode. |
| **SDIS**: | Will spool disassembler code in a form compatible with the BASIC 2 assembler as data is represented with EQUBs. |
| **MEDIT**: | Memory editor with hex/ascii display. Up/Down scrolling with paged ROM/RAM access. Will work in any 40 or 80 column mode. |
| **KLIST**: | Expands soft key definitions and presents them so they can be easily edited, all codes are expanded so that Wordwise type definitions can be changed. |
| **BASE**: | Will accept a number and display its Hex, Decimal & Binary equivalents. |
| **ROMLIST**: | Displays what ROMs are present in your machine and the ROM size. |
| **ROMSAVE**: | Will save any sideways ROM to the current filing system. |
| **FORMAT** | Formats a disk to any number of tracks, from any track. |
| **VERIFY**: | Verifys a disk, shows up bad tracks, and displays an error count. |
| **FREE**: | Displays an analysis of the free space available on a disk. |
| **SFIND**: | Search memory for the occurrence of a specified string. |
| **BFIND**: | Search memory for the occurrence of any sequence of bytes. |
| **XLIST**: | Will search a Basic program for any VDU codes (which may for instance be used to make the program unlistable) and replace them with a "‖". |
| **BAD**: | Will attempt to repair a bad program. |
| **MRELOC**: | Will add a relocating program to a machine code file so that it will automatically download and run. |
| **SLOW**: | Will slow down operation of the BBC (over a variable range) to allow easier playing on many games, and the analysis of operation of graphics, etc. |
| **TDISK**: | Comprehensive file transfer utility allowing you to transfer files between filing systems (i.e. ROM, Net, Disk, Tape & Tape 3). Many features including: locking/unlocking programs, any length of file. |
| **VECTOR**: | Will produce a menu of the programs on a Vector 1 program disk, and run them, this utility will cope with some forms of protection which cannot be handled by any disk based product. |
| **ROFF**: | Will switch off a particular ROM so that it cannot be accessed. Even Scythe can be switched off! |
| **RON**: | Will reactivate a particular ROM, or all ROMs. |
| **SECTLOAD**: | Load sectors from disk ignoring errors. |
| **SECTSAVE**: | Save sectors to disk. |
| **MSHIFT**: | Move memory including paged ROMs. |
| **MSWAP**: | Swap memory including paged ROMs. |

**PRICE £24 INCLUSIVE**

FREE UTILITY/DEMONSTRATION DISK NOW INCLUDED!

# ROM MASTER

A new utility ROM from Chalice Software to help control your BBC. The MASTER allows you to switch off ROMs even through <CTRL> <BREAK> avoiding any conflicts which prevent you accessing a command in another ROM or which stop you playing your favourite game! ROM MASTER contains over 20 commands which apart from ROM management include a sophisticated disassembler, memory editor, file scrambler/unscrambler, function key lister, base converter and many other useful features.

Using ROM MASTER couldn't be easier. Numbers can be entered in DECIMAL, HEX, BINARY or the resident INTEGER variables. ROMs can be specified by their socket numbers, their title or an abbreviation of the ROM title. All commands where relevant will accept lists, so for example you could switch off several ROMs in one command, perhaps mixing socket numbers, titles and abbreviations all on the same line.

**PRICE £16.00 INCLUSIVE**

## ■ VECTOR 1 ♦

*TAPE TO DISK UTILITY*

**Features**

+ Once only purchase
+ Can save to any disk
+ Very user friendly, help pages on disk
+ 40/80 Format
+ No awkward ROMs, can be used on any machine
+ Can load to all available RAM &400 – &7FFF
= Simply the best tape to disk utility available

Vector 1 double density versions compatible with Opus, Cumana, UDM and Watford DDFS.

## ■ VECTOR 2 ♦

*DISK UTILITY*

**Features**:

+ 40/80 Format
+ User friendly, menu driven
+ Contains powerful features such as a disk sector editor, Disk Compare, format, verify and track repair
= The most powerful disk utility available

**Prices**: £12.00 each for Vector 1 or Vector 2

£23 for both.

Not to be used to infringe copyright.

## Dataware

**Slide Master**: Specialised database for the photographer tailored for perfect cataloguing of a photographic collection. (Disk Only) **£16.00**

**Spellwise**: Spelling checker for Wordwise (checks the Wordwise example document in six minutes) **£16.00**

**Contents**: Produces a page numbered contents list from spooled text. **£16.00**

**Mam**: Write your own adventure and test it on the Beeb. Requires Acornsoft Lisp to operate. Eliza is also included on the disk. You write the rules to suit your requirements. (Disk Only) **£16.00**

All software £15.00 if bought with any other product.

## Nucleus Software & Concept Keyboard

The fastest way to teach reading – EFL etc. Many applications which allow teachers to introduce their own ideas. No programming skill required. Please send for details.

# EPROMS

| | | |
|---|---|---|
| 2764 (250ns) | Each | 2.75 |
| 27128 (250ns) | Each | 4.25 |

All prices shown include VAT and p&p. Please add £3.00 per disk if you require 3'' disks and specify when ordering.

Orders to: CHALICE SOFTWARE
3 Merlin Way, Covingham,
Swindon SN3 5AN

*All Enquiries Please Ring:*
*0793-615026*
*Dealer Enquiries are Welcome*

# Graphics come pretty basic

IN **Lode Runner,** from Software Projects, it's time once again for all of you macho types to get your galactic commando uniforms on and right some wrongs.

The evil Bungelings have stolen a fortune in gold bullion and stashed it in an underground hideaway.

You alone can retrieve this stolen treasure and return it to its rightful owners.

To describe the graphics used in this ladders-and-levels game as crude would be a compliment.

On a background of red brickwork and white ladders, three blue stick men chase one white stick man.

I would expect better graphics than this in a game listed in a magazine.

You guide the white stick man around the screen collecting the gold ingots.

The little chap appears to be quite a sturdy character, for he can leap from a ladder or drop from a horizontal rope and still survive, irrespective of how far he has fallen.

The control available are up/down, left-right, and dig. Dig can be used to trap enemy guards or even as a means of escape.

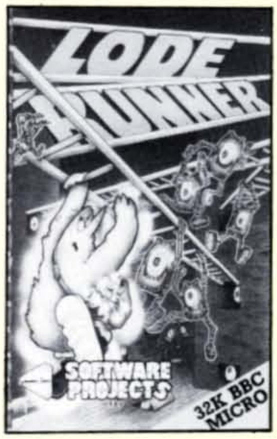
Should the bad guys be closing in on both sides, just whip out your laser drill pistol and blast a hole in the floor. You can then leap to safety in true James Bond style.

When you have collected all the ingots, a new ladder will appear and this is your exit to the next level.

There are 40 of these levels stored in memory, with a further 120 stored on side two of the cassette.

Should these be insufficient, you can use the game's in-built screen editor to create your own. These can be saved to tape and re-loaded at a later date.

The animation of the characters is smoothly done and they exhibit quite a large range of movements – though this shouldn't have provided too many problems owing to their small size. You could have probably got the same effect writing the game in Basic.



If you are looking for a ladders-and-levels game which allows you to create your own screens, have a good look round before committing yourself to this one.

**Jon Revis**

# French with flair

CAMBRIDGE Micro Software have added two computer-assisted language-learning modules to their library. They come together on a single 80-track disc, are avilable in French (as **Quelle tête!** and **Jeu de ménages**) or German (as **Kopfjäger** and **Umziehen**), and are intended for children in their first or second year of language-learning.

The first module is based on identikit pictures. Using highlight selection, you match facial features and adjectives, both chosen from a list in French or German, as the case may be.

The computer draws the results until the face is complete, and composes simple descriptive sentences at the bottom of the screen, emphasising any changes in articles and the position and agreement of the adjectives.

In the second module, where the aim is to provide practice in spelling and the use of prepositions, the screen shows the plan of a house and you're asked to arrange various items of furniture in different rooms.

The items appear on the plan when you type in responses to questions in French or German about where to put them.

Both modules are excellently documented, nicely presented on screen with adequate graphics, and generally well-programmed with some interesting touches.

For example, in the second module up to three spelling mistakes are accepted before the computer fails to understand a response. It then presents what it thinks you meant, and asks for confirmation.

With no authoring facility provided, teachers may find the vocabulary content of under fifty words per module a serious limitation, but the fact that faces and houses can be saved on disc and dumped to a printer, opens up a number of possibilities for classroom use, such as guessing or detective games.

The price of £18.34 per pack is no bargain for two comparatively small programs. But you'll be paying for a high educational quality and an imaginative use of the micro.

**Gabriel Jacobs**

# Two for tots makes a brave start

THE two programs **Griddle** and **Matchplay** prove to be a fairly creditable debut from Clockwork Computing, providing quite valuable practice in early matching and recognition.

Griddle is the less successful of the two, although the idea itself is original and imaginative.

There is a picture which is hidden behind a number of blocks, ranging from four to 36, depending on the level selected.

The blocks can be revealed by correctly answering questions on Shapes, Numbers or Numbers and Numerals.

Although quite attractive, colour is not used sufficiently to hold the attention for long.

Matchplay is altogether a far better program, very simple in content and containing three linked parts: Match, Garden and River.

Match gives practice in recognising the relationship between six animal and two human shapes. The child merely has to recognise similar shapes, even though the colours might not be the same.

These shapes then reappear in a delightful little game called Garden. Here the child decides where in a picture each character belongs.

There is better use of colour here, and I found the program was much more successful for that reason.

In River, there is a scene with some constant features. Others appear in a certain place for a little while before disappearing again.

When they have all been shown briefly, one reappears at a time, moving around on the picture when the Spacebar is pressed. The child has to press Return when the character is in its correct position.

To sum up, these are fair first programs from Clockwork.

**Phil Tayler**

# They're better by the quartet

THE first venture into the games market from Capital Programs is a four-in-one package called, aptly, **Four Games.**

In the first, Picket Line, the object is to get up to 10 pickets to the picket line. Someone had to cash in on it sooner or later . . .

Starting off with four lives, you have to guide your strikers through the hedges and fences, collecting money and food.

Your stock of money and food is shown as a percentage and if you let either drop to zero, you lose a life.

After four screens similar in objective, you finally have to collect as much falling coal as you can from a passing NCB freight train.

Once you have completed the final screen your stiker goes on the picket line and you start all over again.

The second game, The Lost Cavern, is a ladders-and-levels game looking rather similar to Blagger.

As in most of these games, you have to find a route round the screen to collect a number of items, in this case gold pots.

You also have to negotiate a number of obstacles such as disintegrating floorboards, spinning cogs, and lava-flows, avoiding demons and other meanies as you do.

When all the gold pots on one level have been collected, a flashing beacon appears and you must jump on to it to move to the next level.

The third game, Caterpillar, is an old favourite. You have to guide the beast round the garden getting points for eating cabbages and flowers.

These also add to the length of the caterpillar, making the task more difficult.

You must avoid spiders, bushes and the garden wall, for these will kill you, as will turning back on yourself.

There is not much you can say about the last game, Pontoon. It's a pleasant graphic reproduction of the popular gambling game. You start with £500 and play the computer, which acts as the bank.

The end comes when you are broke and I'm absolutely convinced that the computer cheats.

Most occasions when I bet a small amount I got good, easy-to-win hands. But if I got greedy and tried gambling a large amount, the computer inevitably won.

The games, in isolation, would be nothing to write home about, but together, at a few pence under £8, they make quite a good value-for-money package.

The graphics on the first two games are very good, and on the last two are acceptable.

It's true that you only get what you pay for, and a little more time should have been spent tidying up the instruction screens.

Minor irritations such as spelling mistakes – there was one in the instruction screen of each game – marred what would have been a first-rate package.

**David Andrews**

# Trainer for the lathe operator

HAVE you every wanted to "drive" a lathe without fear of accidents? **CNC** (Computer Numerical Control) **Lathe Simulator,** from Micro Electronics Educational Development Centre, gives you that chance.

Much of the modern metal cutting machinery being installed in industry is computer controlled and is programmed using a simple language, rather akin to Turtle Graphics.

It instructs the machine and cutting tool/s to perform various movements and operations. Just as flight simulators take the place of expensive training aircraft, this program allows industry and educational establishments to train new operators without tying up expensive machinery.

Using this package, it is possible to develop a program the effects of which can be viewed at each stage, using a screen simulation of the various tool movements, before transferring it to a CNC lathe.

The benefits are: no waste metal, much quicker program debugging, much quicker learning, and no chance of damaging an expensive lathe.

The graphics have limited reality, but are good enough to give an accurate indication of the student's success as a programmer.

And, although the instruction set is not as comprehensive as that found on an industrial machine, it is sufficiently large to merit the title CNC Lathe Simulator.

The programming syntax is based upon that used by the Emco Compact 5 CNC lathe and it is possible, using connections detailed in the program manual, to transfer a program to one of these lathes and see it in action.

However, you have to be careful, because success on the screen does not ensure success on the lathe.

Some factors cannot be programmed using this simulation: for example, there is no instruction for spindle speed or tool height.

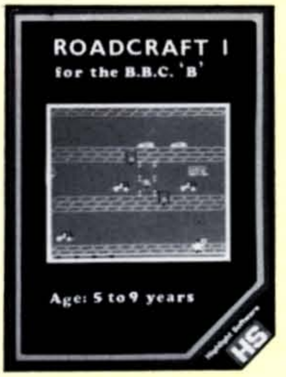
Five different tools can be called up, including a threading tool, and various cutting actions can be followed, such as circular movements, as well as different feed rates.

The package comes with two excellent manuals, function key cards, comprehensive on-screen instructions and built-in error checking.

It does not pretend to take the place of a CNC lathe, but it does rightly claim to act as a foolproof, and much cheaper, early-training resource.

All I need now is a few thousand pounds for a CNC lathe.

**John Daddy**



# Safety aid

THE object of **Roadcraft I** from Highlight Software is to guide Roger Roadcraft across a busy system of roads, but thank goodness it isn't another Frogger lookalike.

The intention is far more serious – that of introducing young children to road safety. The child using the program has to guide him using the cursor keys, and has to avoid various pitfalls which are the sort he might meet outside.

Equally, there are aids to safety available such as zebra crossings, pelican crossings and a very friendly policeman.

Points are awarded at the bottom of the screen but they soon become superfluous, the animated discussion of the children being far more relevant and important.

The program is quite well error trapped and has a few rather gruesome touches – the child who tries to cross from between parked cars freezes on the screen and the cursor keys become inoperative. This results in the child waiting for Roger to be struck down, with no possibility of him moving back onto the pavement.

Obviously this is a deliberate ploy, as is the fact that a child can ignore a crossing, as long as another safe place is selected.

Rather worrying however, is one little problem which the programmers perhaps didn't envisage. If a child halts while crossing the zebra – yes, I know they wouldn't, but children do silly things in real life – a car driving along will hit the child.

**Phil Tayler**

# Biological journey has internal perils

**MICROBA** is a biology adventure game from Resource Facilities. It is introduced by variously-coloured text which explains that the player can wander through the human blood, repiratory, urinary and digestive systems.

The aim is to search for questions and attempt to answer them correctly. For each correct answer the adventurer is awarded five points and a warning states that three of the questions must be correctly answered or the game ceases.

To get into the high-score table, players must have found at least 30 questions and scored at least 20 points.

The journey begins in the mouth, where the adventurer decides whether to be swallowed or inhaled.

Swallowing leads to a route through the oesophagus to the stomach, where it is possible to either carry on or be absorbed.

If the player carries on travelling in the gut, he or she moves through the duodenum, where questions on the pancreas are also asked.

Next is the ileum with its villi, the appendix and its associated bacteria and the caecum where a question on symbiosis is posed. Finally the colon, rectum and anus complete this routeway.

By choosing to be "absorbed" from the gut into the bloodstream, the journey leads through the hepatic portal vein to the liver and from there either through the hepatic vein to the heart or in the bile from the gall bladder to the duodenum and the rest of the gut.

The second major route through the body is via inhalation from the mouth through the trachea, a bronchus, bronchioles and then alveoli where the player can pass into the bloodstream to the heart or be exhaled.

The third route is to be exhaled, but since this scores no marks successful players need to choose the first two routes.

All correct answers invoke a "very good" response, but unfortunately since there is only one correct answer an incorrect input from the player can crash the program.

It is possible for users to alter the acceptable answers, but perhaps by providing a printed list, in random order, of correct answers, mis-spellings might be prevented.

Microba might be of most interest to teachers and students of CSE and "O" Level biology and human biology courses. However, because it is not "crash proof" some supervision will be essential.

**Peter Hillman**

# Great graphics, fun game

ACCORDING to **Bug Eyes,** a new release from Icon Software, things are looking pretty desperate . . .

The enemy spacecraft is closing in on Earth, the one civilised planet standing between the Bug Eyes and Galactic rule.

The call goes out for Agent Starman. Only he can board the alien spacecraft, penetrate the 10 well-guarded levels and destroy the master generator to save the Earth.

Sounds fun and it certainly is.

You control Agent Starman and it's up to you to complete the ten screens. The screens themselves are in the Manic Miner vein, though you don't have to jump – only move left and right.

The game is in Mode 1 and consequently the graphics are truly astounding.

The sprite definitions such as the chubby Starman – complete with paunch – the various bright-eyed nasties and the lifts going up and down are quite beautiful. I'm impressed.

This is combined with smooth animation to provide an almost cartoon-like effect.

Enough of graphics. The sound is adequate, consisting mainly of blips, zips and thuds as our hero runs and falls about the screen.

Yet another nice touch is the choice of playing keys at the beginning. Although, with only two keys you can't go far wrong.

The screens are imaginatively named with such gems as Squidged Flat, where you must complete the screen before a rather heavy column falls to the ground.

The quicker you finish a screen, the more points you score, so it pays to keep your wits about you.

NEW
BBC
BUG EYES
FANTASY ARCADE ADVENTURE
ICON

To sum it all up, it's a fun game to suit all ages with plenty of amusing cartoon-like graphics. A winner.

**Phil Tudor**

# Less than Logo

**PICTURE Logic** is a modified form of an earlier product from Addison Wesley – Logo Challenge.

For those unfamiliar with Logo Challenge, I should explain that Picture Logic is a turtle graphics package implemented in Basic.

Picture Logic comes well-packaged in a plastic "video style" case, which contains a user manual, a tutorial, and program disc. It is also available on cassette for BBC Micro and Electron.

Also included on the disc is software for dumping graphics to several popular printers.

The introduction to the tutorial explains that it is divided into exercises and challenges, the latter being intended to be of an open-ended nature.

I say "intended", because the challenges are often very specific with detailed "give-away" hints and suggestions as to how the challenge is to be attained.

An example of what I mean is: "Challenge 14 – Draw a house by using a square and a triangle. Think! Try typing SQUARE TRIANGLE why does this not give a house?

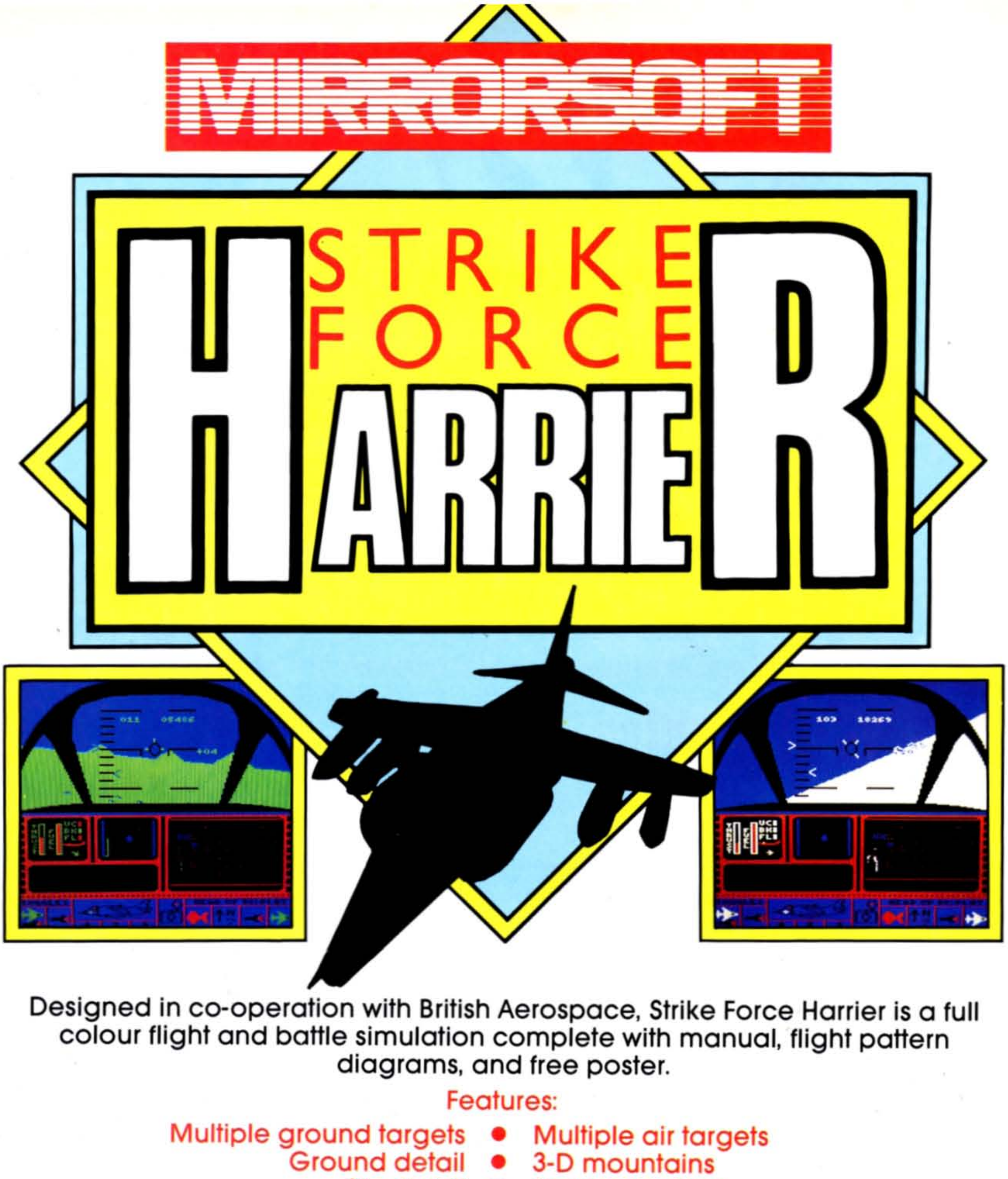
"How can you put in extra commands to make the house like the one in the picture? Hint: You will need to move the pen between SQUARE and TRIANGLE".

It is true there is still some thinking left for the user to do, but how open is it?

It is possible to use a limited number of variables, but unfortunately it is not possible to alter the value of those variables within repeat loops or in tail recursion.

In summary, I see this package as an expensive, inferior Logo surrogate, which I cannot recommend. I am sure that schools can more profitably put £32.10 plus VAT towards the cost of any of the four full Logos now available for the BBC Micro.

**Derek Radburn**



Designed in co-operation with British Aerospace, Strike Force Harrier is a full colour flight and battle simulation complete with manual, flight pattern diagrams, and free poster.

Features:

| | |
|---|---|
| Multiple ground targets | Multiple air targets |
| Ground detail | 3-D mountains |
| Sky detail | Moving horizon |
| Weapon choice | V/STOL |
| Multiple missions | Strategic planning |
| Practice mode | Realistic air combat |
| Full aerobatics | HUD |

Can you meet the ultimate challenge?

Publication October 15th
On cassette for BBC B and Electron £9.95
On disk for BBC B £12.95

MIRRORSOFT
Maxwell House, 74 Worship Street, London EC2A 2EN. Tel: 01-377 4644 (24 hours)
Trade orders: Mirrorsoft Ltd, Purnell Book Centre, Paulton, Bristol BS18 5LQ.

# Galactic gardening

IN **Microcosm** from Firebird, you are a maintenance engineer stranded out in deep space on board a ship carrying a priceless cargo of Terran plant life.

Your task is to repair the ladders and keep the plants alive for as long as possible.

Collecting single parts of the maintenance ladders from one of six dispatch points, you must take them to the base of any ladder.

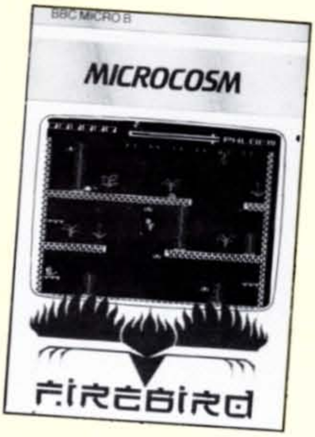
You can only hold one piece of ladder at any one time and it will take a few goes before the ladder you're building is finished.

Next to your score at the top of the screen is the Phloem indicator which displays the health of the plants. With every passing second the Phloem bar decreases. When it gets very low, a beep will sound and this tells you that the plants have started to wilt.

To revive them you must drop your laser back-pack on one of two vacant ledges, then go down to the bottom of the ledge and collect the nutrient-blaster back-pack, which looks like a small watering-can.

With this you can go up to the wilting plants and shoot at them until the Phloem bar rises to a satisfactory level. Then you can swop back to your laser pack and continue rebuilding the ladders.

Hovering around the screen all the time are the mutant insects called Aphids which look like floating faces. These can easily be bumped off with a cool blast from your laser pack.



In later levels you will encounter two more enemies – spiders and beetles.

These generally make a nuisance of themselves by coming down from the top of the screen just at the wrong moment. Both are indestructible so they must be avoided.

Other hazards to avoid are the acid drops which fall randomly from the top of the screen. If you touch one you lose a life. These, too, are indestructible.

There is no joystick option, but the keys are easy to use. While the graphics are only average, the sound is quite good.

Freeze-frame is available at any time, so you do get time to catch your breath.

The game is not too difficult and I feel it will prove popular with the younger generation of game addicts. And, at the price of just £2.50, they won't have to raid their piggy-banks to buy it.

**Simon Rubins**

# Original arcade

ARCADE games probably exist that simulate almost every situation that you are likely to encounter in the wild outdoors, and the general feeling is that ideas must be running out.

Well, here's something different. **April Showers,** from Bevan Technology, is the most original game I've encountered in a long time.

You take on the role of a little white cloud sporting a pair of eyes that would have done Marty Feldman proud.

As you float across an almost clear blue sky, your objective is to help a seedling grow to strong "planthood".

To keep the plant healthy you have to water it. Stunning, eh?

This is initially a simple matter, as all you have to do is hover above it and "rain" on it the contents of your water closet, or whatever it is that clouds hold their supplies in.

Naturally, as the plant grows your reserve dwindles and should you "over-water" the little darling, you get a timely warning.

BEVAN TECHNOLOGY
PRESENTS
APRIL SHOWERS
BBC
APRIL SHOWERS

Ignore this at your peril – because you will disappear in a puff of vapour, to materialise one life down.

Where's the enemy, you ask?

Wait till you encounter the free-floating umbrellas whose sole aim in life is to rob you of your valuable cargo. Every time one touches you, your water content reduces.

The graphics are quite nice, the keys are acceptable, but there are none of the freeze, define keys, or sound off options that should be standard by now in all modern arcade games.

Original it is, addictive, I'm afraid, it isn't – perhaps I'm too old for it.

**David Andrews**

# Lunar let down

THERE have been many variations on the well-known theme of Lunar Lander and its follower Lunar Rescue. **Mayday,** from Bevan Technology, is another addition to the list.

You are the pilot of a Gofarit and your task is to land it on a lunar landscape, retrieve some medical supplies and take off.

There are two landing pads on the surface and you can pick either, though one pad is smaller and is more difficult to get to.

However, landing on this has its advantages in that you score twice as many points.

The actual landing process, although tricky, is only half the battle. It's getting down there that's the difficult bit.

The atmosphere just above the planet's surface is a mass of galactic debris, constantly moving in both directions.

The only way to get down is to use your skill and daring in order to find a way through.

You have keys to control your movement left and right and one to thrust, effectively slowing you down.

BEVAN TECHNOLOGY
PRESENTS
MAYDAY
MAYDAY++
BBC

When you have landed and collected the supplies, you have to make your way back up to the mothership.

As soon as you take off, all the asteriods change into allien spacecraft. Different . . .

These follow exactly the same path as the asteroids did on your descent, but they wouldn't be alien spacecraft if they didn't use you for target practice would they?

Although the original appealed to me when it first came out, this version got a bit tiresome after a short while. The problem was that there was nothing special enough about it to hold my attention.

**Andy Davies**

# More function keys at your fingertips

**PETER GAUNT describes how to use the Shift and Ctrl keys to get the most from your word processor**

**WORDWISE is probably the most popular word processing software for the BBC Micro. One of its useful features is the ability to program the user defined keys with commands which are used frequently, such as long, complicated printer functions.**

Unfortunately most printers, such as the Epsons, have far more useful functions than there are red keys on the computer, the upshot of which is that you have to resort to the printer manual for the less common ones.

Now, at last, help is at hand. This program will let you use the Shift and Ctrl function keys in addition to the normal ones, effectively giving you 22 extra function keys.

You only get another 22 since Wordwise uses the Shift and Ctrl arrow keys itself. You can't have everything.

In addition Wordwise-Plus uses the Shift function keys for its segments so the program expects you to hold down Shift Lock as well to access the definitions in the Shift keys.

The only real restriction is that unlike the normal keys you can't program them while you're using Wordwise but must do this separately using this program.

The program produces a machine code file containing both the key definitions and the software to put them into your text.

It is fully compatible with the SAFE program which was in the December 1984 *Micro User*, though this is no longer needed if you're using Wordwise-Plus.

All errors you might make, such as Bad commands and the like are trapped and when typing the program in you should add a line to PROCreport:

```
IF ERR<>17 THEN REPORT: PRINT" at
line ";ERL:END
```

The extra line can be removed once you have corrected all typing errors.

The program needs PAGE to be at &1900 or higher, as it already will be on a disc machine.

However, if you run it with PAGE set lower it will move itself up to the right place before running.

This is necessary because the machine code which the program produces lives between &1500 and &18FF.

The program will work with tapes as well as discs though you'll have to accept a reduction in the maximum text length.

When you run the program a menu is displayed which gives you the option of loading any old definitions which you might have produced, listing the definitions in memory or saving the definitions which you have typed in.

You can also enter star commands – useful if you're using tapes since you may need to use *CAT to find a blank space on the tape.

To enter new definitions or to change old ones which you have loaded using option 1, you should choose option 2.

The computer will switch into Mode 6 and display a list of the definitions in the Shift function keys. The Copy key is shown as key 11.

Escape will toggle between displaying the definitions in the Shift keys and those in the Ctrl keys while Tab will return you to the menu.

If your TV or monitor does not like the colours which are used in this section, then you should change the values of *fore%* and *back%* which are defined towards the beginning of the program.

To enter a definition into, say, Shift f3, you should press Shift f3 when the list of Shift-key definitions is displayed.

Then simply type the exact sequence of keys which you would use to enter the command directly into Wordwise.

For instance if you want the key to hold the command for justify on, you should type:

**f-key1 (green) jo f-key2 (white)**

You can type any valid Wordwise key into your definition except Escape, Delete and the Shift or Ctrl f-keys.

Some keys, such as Return, cannot be displayed on the VDU and in these cases symbols are used with the background and foreground colours reversed. Type a few in to see the effect.

When you have your definition how you want it, hitting the function key you are re-defining will enter it into the list. If you decide you don't want to enter the definition after all, hit Escape.

You can enter up to 31 characters into any one key. The restriction is due to the size of the BBC Micro's keyboard buffer and if you try to enter more than this the micro will beep and refuse to accept any more.

When you want to save your definitions to disc or tape, hit Tab to return to the menu and choose option 3.

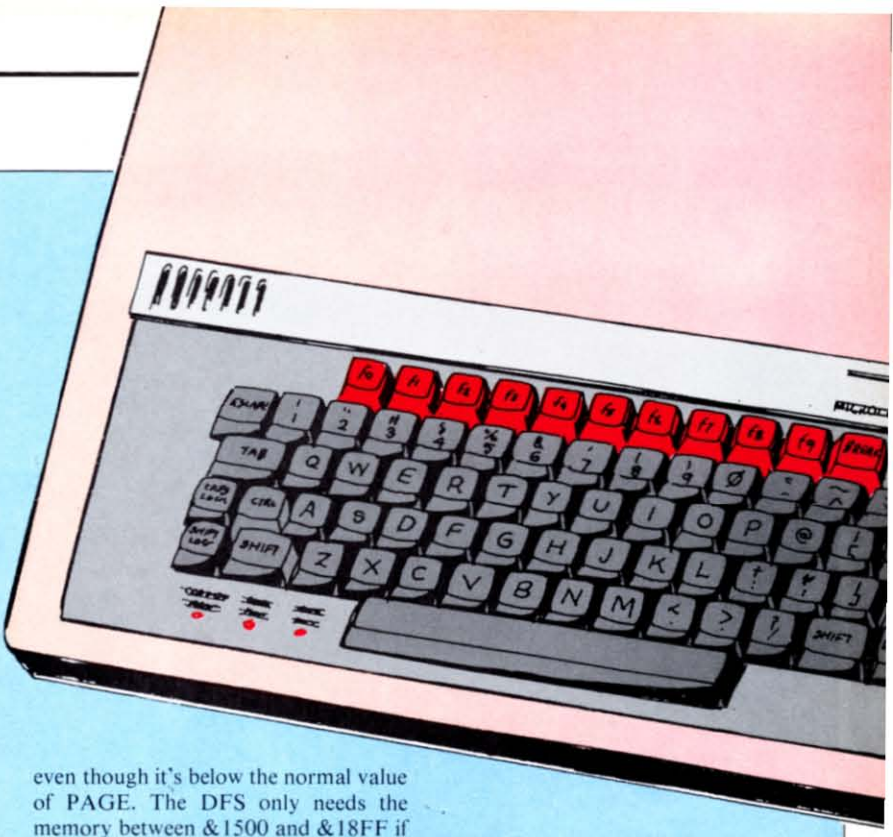
Type in a filename and hit Return.

If you're using disc, a check will be made to see if a file of that name already exists and if it does you'll be asked for confirmation.

To use the definitions in Wordwise *RUN file-name from Wordwise's menu. You can also include *RUN file-name in any !BOOT file which you might use to auto-boot your Wordwise discs.

If you're using tapes you should enter *FX180,25 and then: *WORDWISE before running the code (answer N to Old text?). This raises the value of

```
   10 REM ** Wordwise function key ut
ility **
   20 REM (C) The Micro User 1985
   30 REM By Pete Gaunt
   40 REM This program must run with
PAGE set to &1900 or higher. If run w
ith
   50 REM PAGE too low it automatical
ly relocates itself.
   60 REM Enables use of SHIFT and CT
RL function keys to store strings in
   70 REM addition to usual SHIFT-CTR
L keys. Shift defs. are accessed by h
olding
   80 REM down Shift Lock AND Shift.
   90 REM Creates a machine code file
 (user names it) which lives at &1500
  100 REM Enter *RUN filename from Wo
rdwise menu to run code. Don't do thi
s
  110 REM again without first hitting
 BREAK.
  120 REM If used on tape machines en
ter *FX180,25 then *WORDWISE before
  130 REM *RUNning code.
```



OSHWM up to &1900.

When you enter the FX command you should make sure that you have no document in memory or you will lose it.

You will now find when you're entering text that you have definitions in the Shift and Ctrl function keys.

Don't forget that you must also hold Shift Lock down to get at the definitions in the Shift keys.

You can use the ordinary function keys – with *KEY – as normal.

You'll have room for all those nice printer functions like emphasised and italics, in addition to things like setting up standard pages for different typefaces and paper sizes. Wonderful isn't it?

The code is disabled if you hit Break. Also, if you hit Break while using tapes you may well lose your text.

You must not re-run the file containing your definitions, or run another containing different definitions, without first pressing Break. The computer will get very confused if you do.

The program has two main sections, the first of which is in Basic and is used to enter your definitions. When you choose option 3 an assembler routine is called which produces the machine code actually used with Wordwise.

The code lives at &1500 which is a safe address to use on a disc machine even though it's below the normal value of PAGE. The DFS only needs the memory between &1500 and &18FF if it has three or more files open.

If you're using Wordwise-Plus take care that any programs in the segments don't have more than two files open at a time.

The code uses the "insert character into buffer" vector. Every key press you make is first checked to see if it is a Shift or Ctrl function key.

If it is, then the relevant definition is pushed into the BBC's keyboard buffer.

If you press a Shift f-key a further check is made to see if Shift Lock is also pressed.

I've been using this routine for some time now and have found it a real boon.

I have a number of different sets of key definitions which I use for different purposes – there still aren't enough keys for every occasion.

```
  140 REM Compatible with SAFE ("Micr
o User", December 1984)
  150 REM Code is disabled by BREAK.
  160 REM ____________________________
------------------
  170 REM Global variables: shift%, t
otal%,max%, code, init, lock$ & key$
array
  180 MODE7
  190 HIMEM=&6000:REM HIMEM for Mode
6
  200 IF PAGE<&1900 THEN PROCmove pro
g(PAGE,&1900):END
  210 code=&1500
  220 total%=0:max%=693
  230 back%=1:fore%=6
  240 PROCinit
  250 ON ERROR:PROCreport:PROCmenu
  260 PROCmenu
  270 END
  280 DEFPROCmenu
  290 LOCAL Q%
  300 VDU22,7
  310 REPEAT
  320 PROCwindow(0):CLS
  330 shift%=TRUE
  340 *FX220,27
  350 PRINT''CHR$131"Wordwise functio
n key utility"
  360 PRINT'CHR$134SPC(3)"1. Load def
initions"''TAB(3)CHR$134"2. List/alte
r definitions"''TAB(3)CHR$134"3. Save
 definitions"''TAB(3)CHR$134"*  OS co
mmand"''CHR$133"Choose option";
  370 Q%=FNget-48
  380 IF Q%=1 PROCread_defs:PROClock
  390 IF Q%=2 PROCget_new_defs
  400 IF Q%=3 AND total%>0:PROCassemb
le_code(code):PROCsave_code(code) ELS
E IF Q%=3:PROCwindow(2):PRINTCHR$7CHR
$131"No definitions"''CHR$134"Hit a k
ey";:Q%=GET
  410 UNTIL FALSE
  420 ENDPROC
  430 DEFPROCread_defs
  440 LOCAL Q$,f$,N%,pointer%,char%,b
yte%
  450 PROCwindow(2)
  460 PRINTCHR$131"Load"
  470 IF total%>0 PRINT'CHR$7CHR$134"
Definitions already in store"'CHR$134
"Overwrite?";:Q$=GET$:PRINTQ$:IF INST
R("Yy",Q$)=0 THEN ENDPROC
  480 PRINT'CHR$131;:INPUTLINE"What f
ile name? "f$
  490 IF FNfiling_system<>4:CLS:PRINT
'CHR$133"Please play "CHR$134f$'
  500 PROCoscli("LOAD "+f$+" "+STR$~c
ode)
  510 REM Table of pointers to defini
tions starts at "code".
  520 REM Each pointer is 2 bytes. Ea
ch definition ends in &FF
  530 *FX200,1
  540 CLS:PRINT'CHR$131"Interpreting
definitions....";
  550 FOR N%=0 TO 27
  560 pointer%=!(code+N%*2) AND &FFFF
  570 key$(N%)=""
  580 char%=0
  590 REPEAT
  600 byte%=pointer%?char%
  610 IF byte%<>255 key$(N%)=key$(N%)
```

*Turn to Page 172*

# Nice Password.
# Shame about the Identity.

It's a unique combination.

Your Special Identity Number and Personal Password. The valuable key to huge databases teeming with activity, set on our Mainframes across the nation.

On Micronet 800, you're a valued individual, adding your own special flavour and personality to the database.

Take our exciting new "Gallery"- You control your personal screens for all to see. The intriguing "Chatline" public conversation service gives you freedom to express your views and meet some remarkable people.

All part of a tremendous Communications section that networks you to 60,000 Micronet and Prestel users across the country. Try Teleshopping, or interview celebrities live on "Celebrity Chatline" every Wednesday night.

And there's FREE (& instant) National Electronic Mail, plus International Telex, and the Contact and SwapShop bulletin boards.

Get computer news first on Micronet's daily (and controversial) "Newsflashes" and read up on the latest reviews and courses. Feast from our regularly changing menu of programs to download straight into your micro - absolutely free.

You also get access to Educational Computing's "School Link" and Prestel's huge 300,000 page database, including world news, business & share bulletins and optional homebanking. For only £16.50 per quarter, that's less than the price of a daily paper!

Micronet is unique amongst networks and bulletin boards as it keeps your phone costs very low with special local* rate calls whenever you connect up – that's around 40p for a whole hours entertainment each evening.

The only accessory you need is a Modem, to get the best value for money around in micro communications.

Fill in the coupon for the full facts and send to Micronet 800, 8 Herbal Hill, London EC1R 5EJ. But be warned, Micronet 800 is a 'living' service with ever-expanding features. So maybe you'd be better to call in at your local Micronet 800 Action Station. There are thousands of Micronetters waiting to meet you!

micronet.
800

To: MICRONET 800, Durrant House, 8 Herbal Hill,
London EC1R 5EJ. Telephone 01-278 3143.
Please send me the full facts about Micronet 800.

Name ______

Make/Model of Micro ______

Address ______

______

______

Telephone ______

MU 11

* For 98% of telephone users.
Prestel is a trademark of British Telecommunications plc
On Prestel

# SEE MICRONET 800 IN ACTION

## At selected Boots, Laskys, John Lewis & your local computer store

### AVON

**Bath.** Boots, 1 Marchants Passage, Southgate. Tel: 0225 64402.
**Bristol.** Boots, 59 Broadmead. Tel: 0272 293631.
**Weston Super Mare.** Peter Castell Ltd, 28 Orchard Street. Tel: 0934 24778.

### BEDFORDSHIRE

**Bedford.** Boots, The Harpur Centre, Harpur Street. Tel: 0234 56231.
**Bedford.** Software Centre, 52a Bromham Road, Tel: 0234 44733.
**Leighton Buzzard.** DJ Computers, 17 Bridge Street, Tel: 0525 383929.
**Luton.** Boots, 82-86 Arndale Centre, Tel: 0582 20592.

### BERKSHIRE

**Slough.** Boots, 178-184 High Street, Tel: 0753 27267.
**Maidenhead.** Boots, 54-58 High Street. Tel: 0628 27892.

### BUCKINGHAMSHIRE

**Milton Keynes.** Boots, 18 Crown Walk, Secklow Gate West Tel: 0908 607327.
**Milton Keynes.** Depson Business Systems, 65 Aylesbury Street, Bletchley. Tel: 0908 367446.
**Aylesbury.** Boots, 69-70 Friars Square. Tel: 0296 83661.
**Chesham.** Reed Photo & Computers, 113 High Street. Tel: 0494 783373.

### CAMBRIDGESHIRE

**Cambridge.** Boots, 65-67 Sidney Street and 28 Petty Curry Street. Tel: 0223 350213
**Cambridge.** Cambridge Computer Store, 4 Emmanuel Street. Tel: 0223 358264
**Peterborough.** Boots, 40-42 Bridge Street. Tel: 0733 65352.
**Peterborough.** Logic Sales, Unit 6 Midgate Parade, Tel: 0733 49696.
**St Neots.** Compute, 3 Cross Keys. Tel: 0480 72013

### CHESHIRE

**Chester.** Boots, 47-55 Foregate Street. Tel: 0244 28421
**Chester.** Computer Link, 21 St. Werburgh Street. Tel: 0244 316516.
**Crewe.** Midshires Computer Centre, 57 Earle Street. Tel: 0270 589191.
**Macclesfield.** Computer Centre, 68 Chestergate. Tel: 0625 618827.
**Warrington.** Boots, 39-45 Bridge Street. Tel: 0925 574825.

### CLEVELAND

**Middlesborough.** Boots, 88-90 Linthorpe Road, The Cleveland Centre. Tel: 0642 249616.
**Darlington.** Darlington Computer Shop, 75 Bondgate. Tel: 0325 487478.

### CORNWALL

**St. Austell.** AB&C Computers, Duchy House, 6 Lower Aylmer Square, Tel: 0726 64463.
**Bodmin.** Microtest, 18 Normandy Way, Tel: 0208 3171/3182

### CUMBRIA

**Kendal.** The Kendal Computer Centre, Stramongate. Tel: 0539 22559.
**Whitehaven.** PD Hendren, 15 King Street. Tel: 0946 2063.
**Workington.** Technology Store, 12 Finkle Street. Tel: 0900 66972.
**Penrith.** Penrith Communications, 14 Castlegate. Tel: 0768 67146.

### DERBYSHIRE

**Alfreton.** Gordon Harwood, 69-71 High Street. Tel: 0773 836781.
**Chesterfield.** Boots, 35-37 Low Pavement, Market Place. Tel: 0246 203591.
**Derby.** Boots, 1 Devonshire Walk. Tel: 0332 45886.
**Derby.** First Byte Computers, 10 Main Centre, London Road. Tel: 0332 365280.

### DEVON

**Exeter.** Boots, 251 High Street, Tel: 0392 32244.
**Exeter.** Open Channel, Central Station, Queen Street. Tel: 0392 218187.
**Paignton.** Computer Systems Ltd, 35 Hyde Road. Tel: 0803 524284.
**Plymouth.** Syntax, 76 Cornwall, Street. Tel: 0752 28705.
**Plymouth.** Computer Base, 21 Market Avenue. Tel: 0752 672128.
**Plymouth.** Boots, 2-6 New George Street. Tel: 0752 266271.
**Seaton.** Curtis Computer Services, Seaton Computer Shop, 51c Harbour Road. Tel: 0297 22347.
**Tiverton.** Actron Microcomputers, 37 Bampton Street. Tel: 0884 252854.

### DORSET

**Bournemouth.** Lansdowne Computer Centre, 1 Lansdowne Crescent, Lansdowne. 0202 20165.
**Dorchester.** The Paper Shop, Kings Road. Tel: 0305 64564.
**Poole.** Lansdowne Computer Centre, 14 Arndale Centre. Tel: 0202 670901.

### ESSEX

**Basildon.** Basildon Software Centre, 78-80 Liberty Shopping Hall, East Square. Tel: 0268 27922.
**Braintree.** Mirage Micros, 24 Bank Street. Tel: 0376 48321.
**Chelmsford.** Maxton Hayman, 5 Broomfield Road. Tel: 0245 354595.
**Colchester.** Boots, 5-6 Lion Walk. Tel: 0206 577303.
**Colchester.** Colchester Computer Centre, 3a Short Wyre Street. Tel: 0206 47242.
**Grays.** H. Reynolds, 79 Orsett Road. Tel: 0375 5948.
**Harlow.** Harlow Computer Centre, 17 Staple Tye. Tel: 0279 22846.
**Hornchurch.** Comptel Computer Systems, 112a North Street. Tel: 0402 446741.
**Ilford.** Boots, 177-185 High Road. Tel: 01-553 2116.
**Romford.** Software Plus, 72 North Street. Tel: 70 65271.
**Southend-on-Sea.** Computerama, 88 London Road. Tel: 0702 335443.
**Southend-on-Sea.** Computer Centre, 336 London Road. Tel: 0702 337161.
**Southend-on-Sea.** Estuary Personal Computers, 318 Chartwell North, Victoria Circus Shopping Centre. Tel: 0702 614131.

### GLOUCESTER

**Cheltenham.** Screen Scene, 144 St. Georges Road. Tel: 0242 528979.
**Gloucester.** Boots, 38-46 Eastgate Street. Tel: 0452 423501.

### HAMPSHIRE

**Basingstoke.** Boots, 15 Old Basing Mall. Tel: 0256 51611.
**Bournemouth.** Boots, 18-20 Commercial Road. Tel: 0202 21713.
**Fareham.** Electronequip, 36-38 West Street. Tel: 0329 230670.
**Fareham.** Boots, 21 Westbury Mall. Tel: 0329 232011
**Portsmouth.** Micro Choice, 159 Havant Road, Drayton. Tel: 0705 327591.
**Portsmouth.** RDS Electrical (Portsmouth) Ltd, 157-161 Kingston Road. Tel: 0705 812478.
**Portsmouth.** Boots, 194/204 Commercial Road, Tel: 0705 825248.
**Southampton.** Boots, 23-29 Above Bar Street. Tel: 0703 333983.
**Waterlooville.** GB Microland, 7 Queens Parade, London Rd. Tel: 0705 259911.

### HERTFORDSHIRE

**Potters Bar.** The Computer Shop, 197 High Street. Tel: 0707 44417.
**Stevenage.** DJ Computers, 11 Town Square. Tel: 0438 65501.
**Watford.** SRS Microsystems, 94 The Parade, High Street. Tel: 0923 26602.
**Welwyn Garden City.** DJ Computers. 40 Fretherne Road. Tel: 96 28444

### HUMBERSIDE

**Beverley.** Computing World, 10 Swabys Yard, Dyer Lane. Tel: 0482 881831.
**Grimsby.** R.C. Johnson Ltd, 22 Friargate, River Head Centre, Tel: 0472 42031.
**Hull.** Boots, 48-58 Prospect Centre. Tel: 0482 22334.
**Hull.** Computer Centre, 26 Analby Road. Tel: 0482 26297.

### ISLE OF MAN

**Douglas.** T.H. Colebourn, 57-61 Victoria Street. Tel: 0624 73482.

### KENT

**Ashford.** DGH, 10 North Street. Tel: 0233 32597.
**Beckenham.** Supa Computers, 425 Croydon Road. Tel: 01-650 3569.
**Bromley.** Boots, 148-154 High Street. Tel: 01-460 6688.
**Chatham.** Boots, 30-34 Wilmott Square, Pentagon Centre. Tel: 0634 405471.
**Gravesend.** Gravesend Home Computers, 39 The Terrace. Tel: 0474 28871.
**Folkstone.** Boots, 24-26 Sandgate Road. Tel: 0303 54007
**Maidstone.** Boots, 56-62 King Street. Tel: 0622 53912.
**Maidstone.** Kent Micros, 52 Union Street. Tel: 0622 52784.
**Rainham.** Microway Computers, 39 High Street. Tel: 0634 376702.
**Sevenoaks.** Ernest Fielder Computers, Dorset Street. Tel: 0732 456800.
**Shortlands.** The Village House of Computers, 87 Beckenham Lane. Tel: 01-460 7122.
**Sittingbourne.** Computer Plus, 65 High Street. Tel: 0795 25677.
**Tunbridge Wells.** Boots, 7-11 Calverley Road. Tel: 0892 26486.
**Tunbridge Wells.** Modata Computer Centre, 28-30 St. Johns Road. Tel: 0892 41555.

### LANCASHIRE

**Blackpool.** Boots, 28-38 Bank Hey St & Victoria St. Tel: 0253 22276.
**Blackpool.** Blackpool Computer Store, 179 Church Street. Tel: 0253 20239.
**Bolton.** Computer World UK. 208 Chorley Old Road. Tel: 0204 494304
**Burnley.** IMO Computer Centre, 39-43 Standish Street. Tel: 0282 54299.
**Lancaster.** Northern Lights, 89 Scotforth Road. Tel: 0524 62634.
**Preston.** 4Mat Computing, 67 Friargate. tel: 0772 561952.
**Rochdale.** Boots, 50 Market Way. Tel: 0706 53225.

### LEICESTERSHIRE

**Leicester.** Boots, 30-36 Gallowtree Gate. Tel: 0533 21641.
**Leicester.** DA Computers 104 London Road. Tel: 0533 549407.
**Market Harborough.** Harborough Home Computers. 7 Church Street. Tel: 0858 63056.

### LONDON

**W1.** Computers of Wigmore Street, 104 Wigmore Street. Tel: 01486 0373.
**W1.** Galaxy. 230 Tottenham Court Road. Tel: 01-636 6500.
**W1.** Sonic Foto Micro Center, 256 Tottenham Court Road, Tel: 01-580 5826.
**W1.** Tomorrows World Today, 27 Oxford Street. Tel: 01-439 7799.
**WC1.** Transam Micro Systems, 59-61 Theobalds Road. Tel: 01-405 5240.
**W8.** Boots, 127a Kensington High Street. Tel: 01-937 6882.
**SE7.** Vic Oddens Micros, 6 London Bridge Walk. Tel: 01-403 1988.
**SE15.** Castlehurst Ltd, 152 Rye Lane, Peckham. Tel: 01-639 2205.
**EC2.** Devron Computer Centre, 155 Moorgate. Tel: 01-638 3339.
**N14.** Logic Sales, 19 The Bourne, The Broadway, Southgate, Tel: 01-882 4942.
**N22.** Boots, 38-40 High Road, Wood Green. Tel: 01-881 0101.
**NW4.** Davinci Computer Store, 112 Brent Street, Hendon. Tel: 01-202 2272.
**NW4.** Boots, Brent Cross Shopping Centre. Tel: 01-202 5256/7.
**NW11.** Computers Inc, 86 Golders Green. Tel: 01- 209 0401.

### GREATER MANCHESTER

**Altrincham.** Boots, 13-17 George Sreet. Tel: 061-928 4471
**Hyde.** C Tech Computers, 184 Market Street. Tel: 061-366 8223
**Manchester.** Boots, 32 Market Street. Tel: 061-832 6533.
**Manchester.** Mighty Micro, Sherwood Centre, 268 Wilmslow Road, Fallowfield. Tel: 061-224 8117.
**Manchester.** NSC Computer Shops, 29 Hanging Ditch. Tel: 061-832 2269.
**Marple.** Marple Computer Centre, 106 Church Lane. Tel: 061-449 9933.
**Oldham.** Home & Business Computers, 54 Yorkshire Street. Tel: 061-633 1608.
**Oldham.** Boots, 1 Town Square Shopping Centre. Tel: 061-624 2525
**Stockport.** National Micro Centres, 36 St Peters Gate. Tel: 061-429 8080

### MERSEYSIDE

**Liverpool.** Hargreaves, 31-37 Warbreck Moor, Walton. Tel: 051-525 1782.
**St Helens.** Microman Computers, Rainford Industrial Estate, Mill Lane, Rainford. Tel: 0744 885242.
**Southport.** Boots, 31-39 Chapel Street. Tel: 0704 33907.
**St. Helens.** Boots, 8 Church Street, 24 La Grange Arcade. Tel: 0744 25488.

### MIDDLESEX

**Harrow.** Camera Arts, 42 St. Anns Road, Tel: 01-427 5469.
**Hounslow.** Boots, 193-199 High Street. Tel: 01-570 0156.
**Southall.** Twillstar Computers Ltd, 7 Regina Road. Tel: 01-574 5271.
**Teddington.** Andrews, Broad Street. Tel: 01-977 4716.
**Twickenham.** Productive Computers Ltd, 72 Heath Road. Tel: 01-891 4991.
**Uxbridge.** JKL Computers, 7 Windsor Street. Tel: 0895 51815.

### NORFOLK

**Norwich.** Adams, 125-129 King Street. Tel: 0603 22129.
**Thetford.** Thetford CB & Micros, 21 Guildhall Street. Tel: 0842 61645.

### NOTTINGHAMSHIRE

**Mansfield.** Boots, 39 Four Seasons Shopping Centre, Tel: 0623 23089.
**Nottingham.** Boots, 11-19 Victoria Centre. Tel: 0602 470676.
**Nottingham.** Telstar, 280 Huntingdon Street. Tel: 0602 505585.
**Worksop.** Computer Graphix, 32 Bridge Street. Tel: 0909 472248.

### NORTHAMPTONSHIRE

**Kettering.** Boots, 35 Gold Street. Tel: 0536 514675.
**Northampton.** Boots, 9 The Parade. Tel: 0604 22573

### NORTHUMBERLAND

**Morpeth.** Telerents (Northern) Ltd, 31 New Gate Street. Tel: 0607 513537.

### OXFORDSHIRE

**Abingdon.** Ivor Fields Computers, 21 Stert Street, Tel: 0235 21207.
**Banbury.** Computer Plus, 2 Church lane. Tel: 0295 55890.
**Oxford.** Science Studio, 7 Little, Clarenden Street. Tel: 0865 54022.
**Oxford.** Absolute Sound and Video, 19 Old High Street, Headington, Tel: 0865 65661.

### SCOTLAND

**Aberdeen.** Boots, 133-141 Union Street. Tel: 0224 585349.
**Dundee.** Boots, 49-53 High Street, Tel: 0382 21756.
**Edinburgh.** Boots, 101-103 Princes Street. Tel: 031-225 8331.
**Edinburgh.** Microworld Computer Group, 12 Leven Street. Tel: 031 228 1111
**Edinburgh.** Edinburgh Computers, 51-57 Lothian Road. Tel: 031 229 4418.
**Edinburgh.** Silicon Centre, 7 Antigua Street. Tel: 031 557 4546.
**Glasgow.** Boots, 200 Sauchiehall Street. Tel: 041 332 1925.
**Glasgow.** Microworld Computer Group, 11 Bath Street. Tel: 041 332 1116.
**Glasgow.** Boots, Union Street and Argyle Street. Tel: 041 248 7387.
**Glasgow.** Tom Dixon Cameras, 15-17 Queen Street. Tel: 041-204 0826.
**Glasgow.** Commscot Ltd, 30 Gordon Street. Tel: 041 226 4878.
**East Kilbride.** Boots, 33-37 The Plaza. Tel: 035 52 20629.
**Falkirk.** Boots, 79-91 High Street. Tel: 0324 20535.
**Hamilton.** Tom Dixon Cameras, 8 Cadzou Street. Tel: 0698 283193.
**Peterhead.** North East Computers. 1 Ellis Street. Tel: 0779 79900.

### SHROPSHIRE

**Shrewsbury.** Computerama, 13 Castlegate. Tel: 0743 60528.
**Telford.** Computer Village, 2/3 Hazeldine House, Central Square. Tel: 0952 506771.
**Telford.** Telford Electronics, 38 Mall 4. Tel: 0952 504911.

### SOMERSET

**Taunton.** Boots, 64-65 High Street. Tel: 0823 76061.

### STAFFORDSHIRE

**Newcastle-under-Lyme.** Computer Cabin, 24 The Parade, Silverdale. Tel: 0782 636911.
**Stoke on Trent.** Town Computer Store, 30 Town Road, Hanley. Tel: 0782 287540.
**Stoke on Trent.** Boots, 3-5 Market Square, Hanley. Tel: 0782 23271.

### SUFFOLK

**Bury St. Edmunds.** Boots, 11-13 Cornhill. Tel: 0284 701516.
**Bury St. Edmunds.** The Suffolk Computer Centre, 1-3 Garland Street. Tel: 0284 705503.
**Ipswich.** Computer Magic, 24 Crown Street. Tel: 0473 50965.

### SURREY

**South Croydon.** Concise Computer Consultants. 1 Carlton Road. Tel: 01-681 6842.
**Croydon.** The Vision Store, 53-59 High Street. Tel: 01-686 6362.
**Croydon.** Boots, The Mall, 12-18 Whitgift Centre. Tel: 01-688 6021.
**Epsom.** The Micro Workshop, 12 Station Approach. Tel: 0372 721533.
**Guildford.** Guildford Computer Centre, 5 The Quadrant, Bridge Street. Tel: 0483 578848.
**Wallington.** Surrey Micro Systems, 53 Woodcote Road. Tel: 01-647 5636.
**Woking.** Harpers, 71-73 Commercial Way. Tel: 0486 225657.

### SUSSEX

**Brighton.** Boots, 129 North Street. Tel: 0273 27088.
**Brighton.** Gamer, 71 East Street. Tel: 0273 728681.
**Bognor Regis.** Bits & Bytes, High Street. Tel: 0243 867143.
**Eastbourne.** Boots, 15 Eastbourne Arndale Centre. Tel: 0323 27742.
**Horsham.** Boots, 1 Swan Walk, Tel: 0403 53053.
**Horsham.** Orchard Computer Centre, 34 East Street. Tel: 0403 64884.
**Worthing.** Boots, 48-52 Montague Street. Tel: 0903 207106.

### TYNE & WEAR

**Newcastle-upon-Tyne.** Boots, Eldon Square. Tel: 0632 329844.
**Newcastle-upon-Tyne.** RE Computing, Parkview House, Front Street, 4 Lane Ends. Tel: 091 2701740.
**Sunderland.** Business Micro Communications Ltd, Refuge Assurance Buildings, Saint Thomas Street, West Sunniside. Tel: 0783 654916.

### WALES

**Aberdare.** Inkey Computer Services, 70 Mill Street, The Square, Trecynon. Tel: 0685 881828.
**Aberystwyth.** Aberdata at Galloways, 23 Pier Street. Tel: 0970 615522.
**Cardiff.** Boots, 36 Queens Street & 105 Frederick Street. Tel: 0222 31291.
**Cardiff.** The Computer Shop, 41 The Hayes. Tel: 0222 26666.
**Cardiff.** Cardiff Microcomputers, 46 Charles Street. Tel: 0222 373072.
**Newport.** Gwent Computers, 92 Chepstow Road. Tel: 0633 841760.
**Newport.** Boots, 155-156 Commercial Street. Tel: 0633 51212.
**Swansea.** Boots, 17 St. Marys Arcade, The Quadrant Shopping Centre. Tel: 0792 43461.
**Swansea.** The Micro Store, 35-36 Singleton Street. Tel: 0792 46980.

### WARWICKSHIRE

**Coventry.** Boots, 38-42 Corporation Street. Tel: 0203 26561.
**Leamington Spa.** Boots, 31 Parade. Tel: 0926 24945.
**Leamington Spa.** Leamington Hobby Centre 121 Regent Street. Tel: 0926 29211.
**Nuneaton.** Micro City, 1a Queens Road. Tel: 0203 382049.
**Rugby.** O.E.M., 9-11 Regent Street. Tel: 0788 70522.

### WEST MIDLANDS

**Birmingham.** Boots, City Centre House, 16-17 New Street. Tel: 021-643 7582.
**Dudley.** Central Computers, 35 Churchill Precinct. Tel: 0384 238169.
**Stourbridge.** Walters Computer Systems. 12 Hagley Road. Tel: 0384 370811.
**Walsall.** New Horizon, 1 Goodall Street. Tel: 0922 24821.

### WILTSHIRE

**Trowbridge.** West Wiltshire Micros, Whiteheart Yard. Tel: 02214 67259.

### YORKSHIRE

**Bradford.** Boots, 11 Darley Street. Tel: 0274 390891.
**Doncaster.** Boots, 13-15 French Gate, Tel: 0302 62238.
**Barnsley.** Boots, 34-40 Cheapside. Tel: 0226 82616.
**Huddersfield.** Micro World Computers, 1006-1010 Manchester Road, Linthwaite. Tel: 0484 846117.
**Huddersfield.** Boots, 22 King Street. Tel: 0484 21756.
**Leeds.** Boots, 19 Albion Arcade, Bond Street Centre. Tel: 0532 33551.
**Leeds.** Micro Power, Northwood House, North Street. Tel: 0532 458800.
**Sheffield.** PIP Micro Communications, 9 Taptown Crescent, Broomhill. Tel: 0742 661096.
**Sheffield.** Boots, 4-6 High Street. Tel: 0742 78333.
**Wakefield.** Boots, 26-28 Upper Kirkgate. Tel: 0924 376181.
**York.** York Computer Centre, 7 Stonegate Arcade. Tel: 0904 641862.

micronet 800

Phone 01-278 3143 for your free information pack now !
Micronet 800, 8 Herbal Hill, London EC1.

# OPUS WILL MAKE YOU A BETTER ORGANISER FOR ONLY £60

If your micro system is starting to get out of hand a smart organiser could be the solution to your problems.

At just £59.95 the Organiser desk from Opus Supplies will help to organise your system beautifully. It's purpose built to provide plenty of storage space and because it's produced alongside our range of executive computer desking it offers a level of quality you'll appreciate.

**Shelving accommodates your monitor, printer computer, disc drive or cassette recorder and software, and the teak-finished unit is fitted with castors to make it fully mobile.** The Organiser's **assembled dimensions** are: H. 31″, W. 40¼″ and **D. 28″.**

**And our price includes VAT and FREE DELIVERY.**

**The Organiser desk is suitable for use with all leading home micros including the BBC, Amstrad, Commodore and Sinclair computers.**

**Getting organised couldn't be easier. Phone us on 0737 65080 or simply post the coupon below.**

To: Opus Supplies Ltd,
55 Ormside Way, Holmethorpe Industrial Estate, Redhill, Surrey.

Please rush me the following:
(PRICES INCLUDE VAT AND CARRIAGE)

__________ Organiser Desk(s) at £59.95 each (inc. VAT)

I enclose a cheque for £__________ or please debit my credit card account with the amount of £__________

My Access ☐ Barclaycard ☐ (please tick) no. is:

__________

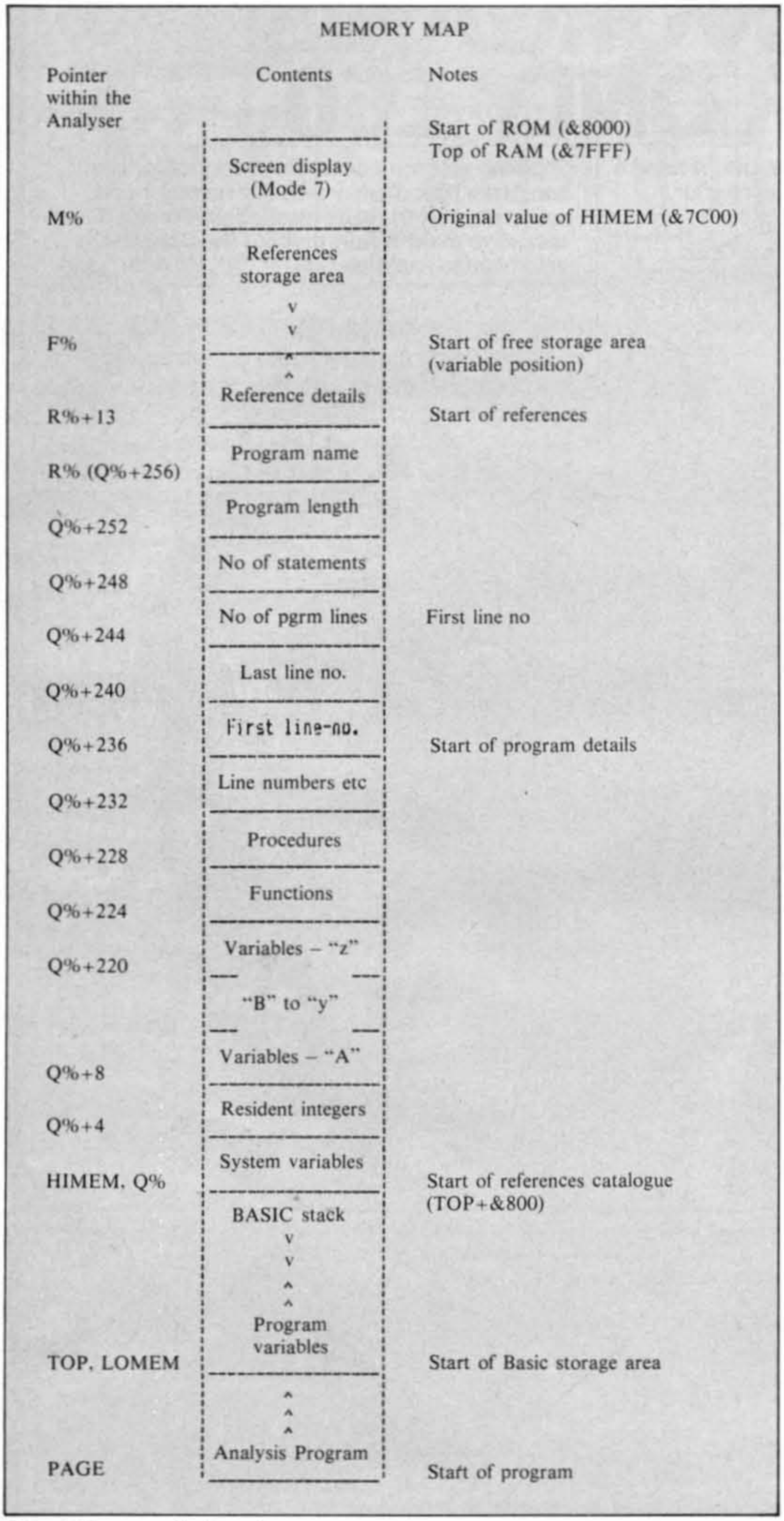
Name __________

Address __________

Telephone __________

MU11

Opus.
Opus Supplies Ltd.



MEMORY MAP

| Pointer within the Analyser | Contents | Notes |
|---|---|---|
| | | Start of ROM (&8000)<br>Top of RAM (&7FFF) |
| | Screen display (Mode 7) | |
| M% | | Original value of HIMEM (&7C00) |
| | References storage area<br>v<br>v | |
| F% | | Start of free storage area (variable position) |
| | ^<br>Reference details | |
| R%+13 | | Start of references |
| | Program name | |
| R% (Q%+256) | | |
| | Program length | |
| Q%+252 | | |
| | No of statements | |
| Q%+248 | | |
| | No of pgrm lines | First line no |
| Q%+244 | | |
| | Last line no. | |
| Q%+240 | | |
| Q%+236 | First line-no. | Start of program details |
| | Line numbers etc | |
| Q%+232 | | |
| | Procedures | |
| Q%+228 | | |
| | Functions | |
| Q%+224 | | |
| | Variables – "z" | |
| Q%+220 | | |
| | "B" to "y" | |
| | Variables – "A" | |
| Q%+8 | | |
| | Resident integers | |
| Q%+4 | | |
| | System variables | |
| HIMEM, Q% | | Start of references catalogue (TOP+&800) |
| | BASIC stack<br>v<br>v<br>^<br>^<br>Program variables | |
| TOP, LOMEM | | Start of Basic storage area |
| | ^<br>^<br>^<br>Analysis Program | |
| PAGE | | Start of program |

*Figure I: Memory used by the analyser*

**HAVING given some background information last month, I'll continue by describing the main body of the Basic Analyser program. This will read in any Basic program, stored on disc or cassette, line by line, check the syntax of the program statement by statement, and build up in the free memory a table of variable names and references.**

The process of syntax checking and table building can be applied to either the whole program or to that part between given start and end line numbers.

On running the program you are prompted for three inputs, each of which is terminated by pressing Return:

- The file name of the program to be analysed.
- The starting line number for the analysis or simply Return to specify the start of the program.
- The finishing line number for the analysis, or just Return to specify the end of the program.

## Part II of the Basic Analyser program by MICHAEL STALLYBRASS

Having got these essential details, it will analyse the program as requested. The ability to start and end the analysis in the middle of a program enables the syntax of even the longest to be checked, without running out of workspace, by using a couple of passes.

Because of the need to keep a reasonable amount of workspace available for the reference table, I have split the program into two parts, with the first part chaining the second.

The first part, given as this month's listing, performs the analysis and syntax checking. The second part, to be listed next month, is used to print or display all, or part, of the information built up in the reference table.

Thus by using this month's listing you can check the syntax of any program, but you will have to wait till next month – or write your own Part2 – to print out the completed cross reference tables.

It takes about four minutes for Part1 to analyse itself completely, but takes

# Analysis and syntax checking

rather longer for Part2 of the analyser to print out the complete results.

The analyser program fits itself into whatever memory is available between PAGE and HIMEM. It will work with any version OS, and any version of Basic, on both the BBC Micro and the Electron, though the size of program that can be analysed using an Electron is limited, as Mode 7 is not available.

The way that the program uses the available memory is shown in Figure I. Note that when run HIMEM is altered by the program to protect the references table.

Part of the memory used up by the program immediately above the new value of HIMEM is used as a catalogue, similar to that used by the Basic interpreter for finding variables.

However, beside the catalogue entries for each possible initial variable letter, FNs and PROCs, the analyser's catalogue has three extra entries, for references to system variables (HIMEM and so on) the resident integers (@%-Z%), and for line number references as in GOTO.

The remainder of the memory set aside by the program is used to contain lists of names and line numbers, and, associated with each primary entry, secondary lists of references pinpointing each program line in which a reference occurs and its context.

Each of the primary entry lists is pointed to by a non-zero catalogue value. A zero catalogue value indicates that there is no associated list for that type of entry. Details of the structure of these lists are given in Figures II to V.

| Offset | 0 | 1 | 2 | 3 | 4 | 5 | .. | .. |
|---|---|---|---|---|---|---|---|---|
| Contents | next primary entry | | start of secondary references | | type of ref. | name | | |

*Figure II: Variable names, and primary entry storage*

| Offset | 0 | 1 | 2 | 3 | 4 |
|---|---|---|---|---|---|
| Contents | next secondary reference | | line number of reference | | context code |

*Figure III: Variable names, secondary reference storage*

| Offset | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|---|---|---|---|---|---|---|---|---|
| Contents | next primary entry | | start of secondary references | | line number (or other code) referred to | | | |

*Figure IV: Line number references, primary entry storage*

| Offset | 0 | 1 | 2 | 3 |
|---|---|---|---|---|
| Contents | next secondary reference | | line number of reference | |

*Figure V: Line number references, secondary reference storage*

The normal Basic workspace is in the gap that is left between TOP and the new value of HIMEM. I have found that a gap of &800, as set in line 130, has always been sufficient, but that reducing it much can cause a "No room" error.

However it is possible that a program with heavily bracketed expressions could still cause a "No room" error, even with this gap. If this happens simply increase the gap size a bit until the problem goes.

The analysis program – see Program I – can be considered in a number of logical blocks. The first simply initialises the analysis. Some initial constants are set and the analyser catalogue is created and cleared. It obtains the file name of the program to be analysed, opens the file, checks that the file is a Basic program, and then obtains the limits for the analysis.

A list of all the significant program variables is given in Table I. In choosing

→

## *From Page 91*

names for FNs and PROCs I have given any which deal with a specific Basic keyword that keyword, in upper case, as its name. For example, PROC PRINT deals with PRINT satatements. All other names are made up using lower case letters only.

The main program loop is in lines 250 to 260, which reads in the program line by line and checks for the end of the program by a call to FNline, lines 290-370, and then, if required, analyses the line statement by statement by calling PROCstmt, lines 490-550, until the end of the line is reached, as checked for by FNend, lines 390-430.

The program is read a line at a time into the line buffer *B%* from the filing system in use. If your system uses a cassette recorder and your recorder does not have motor control you will probably have to give some assistance by starting and stopping the recorder whenever the cassette motor light on the keyboard goes on and off. Otherwise you may find that the recorder plays the program back faster than the computer can analyse it.

The analysis of each line is then done sequentially, character by character, with the current character being pointed to by *P%*, and its value held in *C%*.

The current character can be incremented by three procedures, defined in lines 2610-2630, PROC@ (which gets the next character, skipping any spaces), PROC@i (which gets the next character, even if it is a space), and PROC@c (which gets the next non-space character, but only if the current character is a space).

The first lines of this block are concerned with checking for the ends of a statement or line. FNend is called whenever the end of a statement should have been reached. It checks for the end of the line, or else for a valid statement terminator, as indicated by *I%*.

If *I%* is zero, no terminator is necessary, otherwise one is expected. IF *I%*=1, it can only be a colon, but if *I%*=2 it can also be the token for ELSE following an IF statement. FNmore and FNmore0 (lines 450-470) are used to check if there is still more to be processed within a statement.

The real meat of the program starts at line 490 with PROCstmt, which actually initiates the analysis of a statement.

| Name | Use |
|---|---|
| A% | Assembler in use flag |
| B% | Pointer to input buffer area |
| C% | Current charcter being scanned |
| D% | Number of statements in current line |
| E% | Input channel number |
| F% | Pointer to free storage |
| G% | Constant (&FFFF) |
| H% | Constant (&FFFF0000) |
| I% | Statement separator required flag |
| J% | Local loop variable |
| K% | Constant (&10000) |
| L% | Length of current line |
| M% | Pointer to top of workspace |
| N% | Current line number |
| O% | Line number being referred to |
| P% | Pointer to current character in line |
| Q% | Pointer to start of catalogue area |
| R% | Pointer to start of variable workspace |
| S% | Catalogue entry offset |
| T% | Expression or variable type |
| U% | Context |
| V% | Number of primary references |
| W% | Number of secondary references |
| X%, Y%, Z% | Working variables in reference additions |
| | |
| b% | Line to be analysed flag |
| b1% | First line number in analysis range |
| b2% | Last line number in analysis range |
| v% | Value of current numerical constant |
| vd% | Length of VDU queue |
| a$, q$, z$ | Working variables in building up current name. |
| n$ | Current name to be added to reference table. |

*Table I: Main variables*

| Code | Meaning |
|---|---|
| -ve | Error |
| 0 | FN value – numeric or string |
| 2 | Integer |
| 3 | Integer array |
| 4 | Real |
| 5 | Real array |
| 8 | String |
| 9 | String array |

*Table II: Variable type codes*

In BBC Basic, a statement can be one of only five types. It can be either:

- An assignment statement, say *x*=1
- A System Procedure – CLS
- A function return – =1
- An assembler statement (within [ ] brackets)
- An operating system command, say *FX4

In PROCstmt the first check is for an assembler statement, where *A%* is used as a flag to indicate that the assembler is being used. If it is, the statement is dealt with by a call to PROCass (lines 1340-1400). Otherwise, if the statement is not an operating system command (when the rest of the line is ignored), a function return, or a system procedure (dealt with in PROCtoken, lines 1450-1720), it must be a variable assignment, and is dealt with accordingly by lines 550 to 590.

Note that LET and the assignment of new values to the system variables HIMEM, LOMEM, PAGE, PTR# and TIME are all taken to be system procedures – see Table V in the last article – and so a re-entry point to the assignment code is provided by PROC_LET in line 570.

| Bit(s) set | Meaning |
|---|---|
| 7 | A variable is being set on left of =, in DIM, LOCAL and so on |
| 6 | A variable is being used with an indirection operator |
| 5 | A variable is being used as an array subscript |
| 4 | A variable is being used as a Function argument |
| 3,2,1,0 | Details of the calling context: |

| Value | Bit 7 set | Bit 7 clear |
|---|---|---|
| 0 | Assignment (. . . =) | Assignment (= . . .) |
| 1 | PROC/FN argument | PROC parameter |
| 2 | LOCAL | Value returned by FN |
| 3 | DIM | Used in an IF expression |
| 4 | DIM (byte array) | Used in an UNTIL expression |
| 5 | FOR variable | Initial value of FOR variable |
| 6 | NEXT variable | Final value of FOR variable |
| 7 | Not used | STEP value in FOR loop |
| 8 | Not used | Channel number |
| 9 | INPUT value | PRINT value |
| 10 | INPUT# value | PRINT# or BPUT# value |
| 11 | READ value | CALL parameter |
| 12 | Not used | ON expression |
| 13 | Not used | GOTO or GOSUB line number |
| 14 | Assembler label | Assembler label |
| 15 | Not used | Assembler operand |

*Table III: Variable and function reference context codes*

| Number range | Context |
|---|---|
| &00000 to &0FFFF | GOTO |
| &10000 to &1FFFF | GOTSUB |
| &20000 to &2FFFF | RESTORE |
| &3FFFF | DATA |
| &4FFFF | ERROR |
| &50000 to &5FFFF | TRACE |

If the least significant four nybbles equal &FFFF then there is no line number identifiably referred to. Otherwise, the least significant four nybbles of the number give the line number referred to.

*Table IV: Line number reference context codes*

The expression evaluator can be entered at one of three levels. At each level of entry the context is specified by *U%* – see Table III for an explanation of the values used.

The outer level of entry, FNexp1 (630-640), is used when any expression is valid, which can consist of variables, functions and constants, joined by operators such as +, MOD, AND.

The next level of entry, FNval (lines 730-790) is used when a single value – a single variable, function or constant – rather than an expression is expected. The inner level of entry, FNvar (lines 760-790) is used when only a variable name is valid.

In evaluating an expression, its type is determined, and stored in *T%* – see Table II for an explanation of the different possible values of *T%*. Thus some cross checking of expression types is possible. However when a FN is accessed the type is not known so the cross check cannot be complete.

In this part of the program these functions can be recursive, that is they can call themselves as whenever a bracketed expression is encountered the outermost level of all, FNexp0 (line 610), is called.

Calls to PROCind and FNargs can also cause recursion. Because of this possibility some key variables are declared as LOCAL in various places to ensure that any recursion alter the variables' expected value.

FNexp0 in turn calls FNexp1 and then checks for the closing bracket. FNexp1 calls the next level, FNexp2 (lines 660-680) and then deals with the logical operators AND, EOR, and OR, if present.

FNexp2 in turn calls the next level, FNexp3 (lines 700-710), and then deals with the logical comparison operators =, >, <, >=, and <=, if present. FNexp3 in turn calls FNval, and then deals with the arithmetic operators +, –, *, /, DIV, MOD, and ^, if present.

Note that this arrangement has somewhat simplified the rules of operator precedence (for an explanation of the rules, see the BBC User Guide page 145). For a full expression evaluator, FNexp1, which deals with operator groups 6 and 7, would have to be split in two to allow for the rules of precedence, and FNexp3, which deals with operator groups 4, 3, and 2, would have to be split into three.

The next level, FNval, should not have any binary operators left to be dealt with, except for the indirection operators, which act as a modifier to a variable name.

It checks first for a quoted string, then for unary plus and minus signs. Then, if the character is a bracket, goes back to FNexp0. If instead it is a valid function token, this is dealt with by FNfn (lines 900-960). Otherwise it must either be a constant, dealt with by one of FNstr (lines 1300-1320), FNhex (line 1230), or FNnum (lines 1250-1280), or else it must be a variable, in which case the program code falls through into FNvar.

The analysis of any presumed variable is done by FNvar. It checks for unary indirection operators and if necessary calls PROCind (line 880) to deal with them.

It then obtains the variable name by calling FNnam (lines 810-860), checks for binary indirection and deals with it if necessary by a second call to PROCind, and finally adds an entry to the reference table by a call to PROCref (lines 2750-2770).

FNnam not only gets the complete name, but also sets the variable type (T%) and the catalogue entry position (S%). If an array is found it also analyses the subscripts and adds an appropriate suffix to the name, by a call to FNargs (lines 1070-1120). It cannot, however, complete the reference table entry, because of the possibility of binary indirection – a following ! or ? – with a corresponding alteration to the

→

*From Page 93*

context code.

FNfn (lines 900-960) deals with all function tokens found in an expression. Any user defined functions, indicated by the FN token, are passed on to FNfn_procnam (lines 1140-1170) for complete analysis. Of the remaining tokens those associated with the system variables are passed to FNsysvar (lines 1190-1210).

If the token is one connected with random access filing, BGET# and so on, the channel number is checked by PROCchannel (lines 2480-2500). All remaining system functions that cannot have parameters are then filtered out (line 920). This leaves some functions which require special checking: RND, which can, but need not have a parameter; TOP, which is the TO token with a following P;USR, where I wanted to specifically identify the address called; and STR$, which can have a tilde preceding its parameter.

The remainder dealt with in line 950, consists of all the other functions that take one parameter, checked by FNval, or more than one parameter, checked by FNargs.

FNargs is called whenever there is a bracketed list of FN/PROC arguments or array subscripts to be dealt with. It returns a string which indicates the number and type of any expressions within the brackets, using # for a numerical expression, $ for a string one and * for a FN of unknown type. As the function can be called when a DEF FN/PROC is encountered, and in these circumstances there may only be variable names, it selectively calls FNvar or FNexp1, according to the context code, for each argument or subscript.

FNfn_procnam is similar to FNnam, but it obtains the name of a FN or PROC. It also completes the addition to the reference table by a call to PROCr before returning zero to indicate unknown expression type for a FN. FNsysvar, called whenever there is a reference to a system variable, also completes the addition to the reference table.

FNhex is called to decode any constant that starts with an ampersand, &. Other numerical constants are decoded by FNnum. FNnum is complicated by the possibility of an exponent in the constant. If the first non-numeric character found is an E, then a check must be made for following digits before the E can be accepted as a part of the number, and the pointer *P%* may have to be repositioned as a result. This check is done in line 1280.

For both types of numerical constant its value is obtained and held in *v%*, for subsequent use in VDU statement checking.

String constants, that is those enclosed in double-quotes, are dealt with by FNstring. This function is slightly complicated by the need to deal with pairs of double quotes, which are used to represent a single double quote within the constant string, hence the recursive call in line 1320.

The first check in dealing with assembler statements (lines 1340-1430) is for a closing square bracket, which ends the use of the assembler. Next the presence of an assembler label is checked for – signalled by a "." – and if necessary dealt with. If the end of the statement has not been reached, all characters are then skipped until a space, backslash, or end of statement is found. If a space is found it is assumed that an assembler operand follows, and this is evaluated by FNassv (lines 1420-1430).

PROCtoken deals with all the system procedure calls. The majority are dealt with by a call to one of the specific token PROCs, with capital letter names, and the remainder are dealt with in line 1710 if they take no parameters, or in line 1720 with a call to PROCparams (line 2580) if they do take parameters.

The specific token PROCs (lines 1740-2460) are in the main clear in their operation. As they simply follow the syntactical rules governing each keyword, as outlined last month, I have not dealt with them in detail. Any apparent quirks are necessitated by the syntactical peculiarities as highlighted in last month's article.

PROCchannel (line 2480) is called whenever a # must be the next character, say after BPUT. It falls through into PROCchannel0 (line 2490), which is called whenever a # has been found, as after PRINT.

The most obscure function of this group is probably FNformat (line 2520), which works its way, by means of recursion, through all formatting elements allowed in INPUT or PRINT statements, until it reaches a non-formatting item, end of statement or variable name. Control is then passed back to the calling routine, to process this next variable.

PROCgo and FNlineno (lines 2550-2560) together deal with any encoded line numbers, converting them back to a normal integer number before making a reference table entry. Alternatively a non-encoded reference may be found, in which case a dummy line-number is used (&FFFF), to highlight any references that will not be correctly dealt with by RENUMBER commands – see Table IV.

PROCparams and PROCvlist (lines 2580-2590) respectively deal with any lists of expressions or lists of variables that may be found.

PROCsyntax (lines 2650-2700) is called whenever a syntax error is detected. The type of error is indicated, and the complete line is printed out, without being detokenised, but with all tokens and control characters being replaced by a block character. The character where the error was detected is indicated by an upward arrow under the text of the line, and by the preceding line of the display.

PROCe or PROCer (lines 2720-2730) are only called when a fatal error is detected.

The last section of the program is perhaps the most difficult to follow. Because it is the most heavily used part of the program, it has been written for speed rather than for clarity.

PROCref (lines 2750-2770) deals with all name entries. It searches through a primary chain of entries, whose start is pointed to by *S%*, until it finds the required name, or has passed where it should have been in strict Ascii alphabetical sequence, Z coming before a.

If the name is not found a new entry is stitched into the chain at this point by a call to PROCadd. Once the entry exists the required reference is stitched into the beginning of the secondary chain.

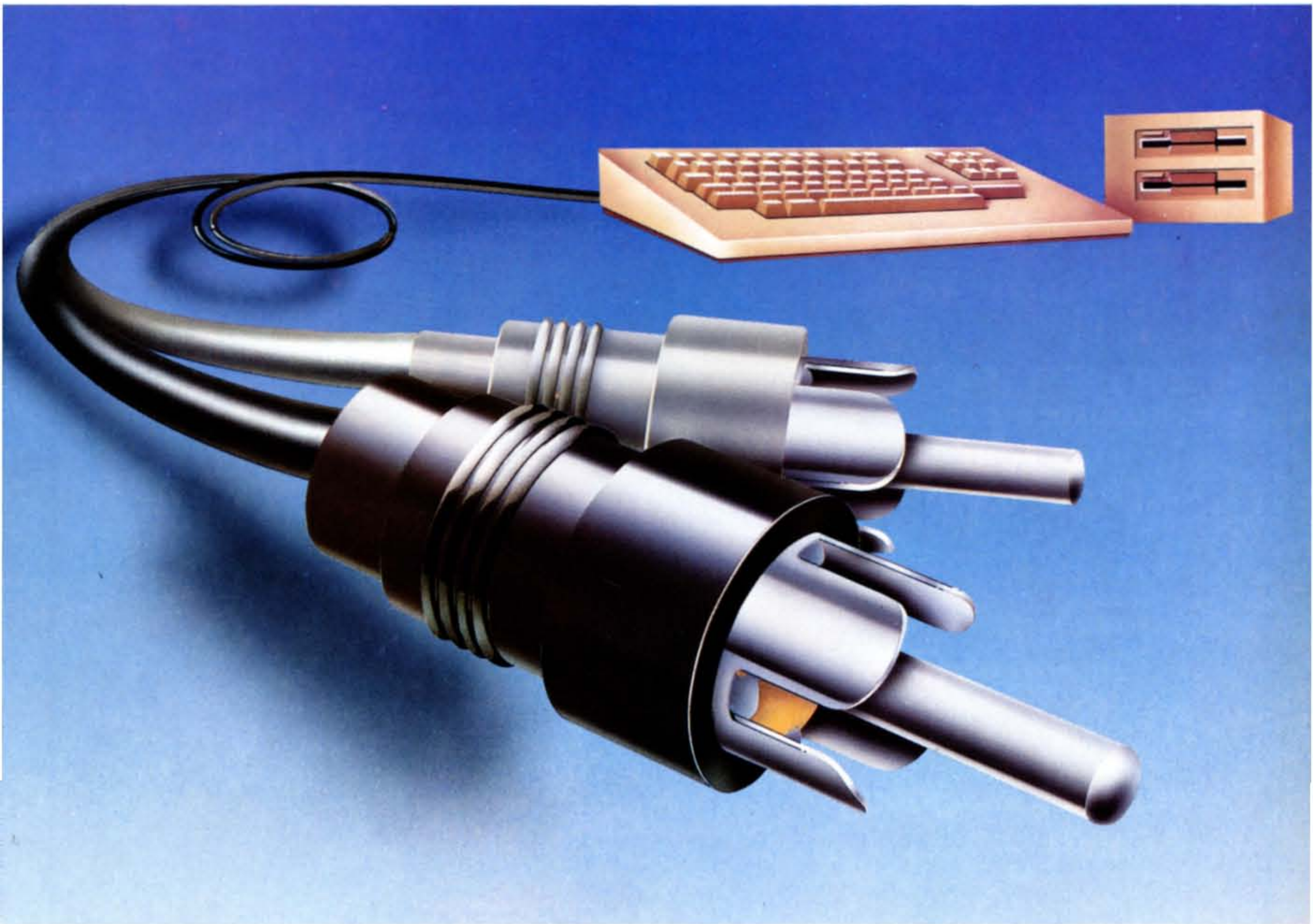
This means that the secondary chain, if followed, is in reverse order of occurrence of the references within the program. But it also means that there is no time-consuming following of the chain to find the end before adding in the reference.

PROClineref and PROClineadd work in a similar way for line number references.

● *Next month, we'll give a complete description and listing of Part2, the program which prints out the results of the completed analysis.*

**Full listing starts on Page 154**

# HOW DO YOU MAKE A COMPUTER SHARPER?



# PLUG IT INTO A PHILIPS PERSONAL MONITOR.

A Philips personal monitor gets the very best out of your computer. It makes using your computer more rewarding as the definition and resolution gives the clear display you need.

Philips offers you a complete range of both colour and monochrome monitors. One of them is exactly right for your computer. With over 50 years in screen technology, Philips know how to give you the right image.

Philips personal monitors are suitable for virtually all personal and home computers. Just complete the coupon and we'll send you full information.

Post this to: Stephen Paul, Marketing Manager, Computer Monitors, Philips Electronics, City House, 420/430 London Road, Croydon, Surrey CR9 3QR

NAME: ______________________ Tick if trade enquiry ☐

ADDRESS: ______________________

______________________ POSTCODE: ______________ MU

## PHILIPS. TAKE A LOOK AT OUR IMAGE.

**PHILIPS**

**Vine Micros**

THE LEADERS IN
TAPE TO DISC TRANSFER
FOR THE BBC COMPUTER

# *AN EXCITING NEW* DISC UTILITY

**100%**
**effective**

# REPLAY

A 'MUST'
for all
DISC USERS

## THIS IS A UNIQUE HARDWARE/ROM-BASED SYSTEM

**BBC 'B' Disc Drive Users - Do you want 100% TAPE TO DISC TRANSFER?**
**Have you heard about the REPLAY System from VINE MICROS?**
**The *only* system around that can dump anything in the computer memory into disc . . . .**

**£35·00**
inclusive of VAT
and post

**AND THAT'S NOT ALL!** **Just look at these extra features . . . .**

* GAMES can be stopped and saved directly to disc at any time. This means that you can resume play from *where you left off* and don't need to work through earlier screens time after time.

* STOPPED SCREENS can be re-loaded from disc and printed via a suitable routine, enabling a permanent record of those high scores!

* GAME IMPROVEMENTS can be built in! Infinite lives - Hyperspeed - Extra gears - Different background colours - Edit your own improvements or work from the data sheets supplied by us.

* PAUSE facility built in.

* PLUS - most disc to disc transfer.

The **REPLAY** System will not turn you into a pirate!
It solely provides a facility for an individual user. Resulting discs are not recognised by a different computer.

*** * Consists of ROM with additional hardware * ***
*** * Easy to fit with detailed instructions, no soldering * ***

*FOR BBC 'B' with O.S. 1.20. - FITTED WITH THE FOLLOWING DFSs (State type).*

**Type R8271**
*Acorn DFS/DNFS*
*Watford and Pace*
**Single Density**

**Type R1770**
*Opus 3.45 and Solidisk*
*DFS.*

**Type R2791**
*Opus 3.15.*
**Type R2793**
*Opus 3.35.*

**N.B. If you have an extension ROM board, please make sure that there is still room on the MAIN computer board for the REPLAY ROM**
**£8.00 DISCOUNT offered for T.D. ROMs to those users wishing to up-grade to REPLAY. (Mail Order Only).**

## ADDCOMM

This versatile ROM will suit all your TOOLKIT and GRAPHIC requirements. Forty extra commands are added to BBC BASIC including LOGO GRAPHICS. Highly rated in reviews and real value for money at:

**£28.00 including VAT and post**
(Brochure available)

## TD ROM ©

Have you just bought a disc drive and wish that more of your software was on disc? Then sit back and let the T.D.ROM transfer most of your tapes to disc easily and efficiently. The T.D.ROM handles any length of program and can save to any disc. To suit DFS types as for REPLAY. Economically priced at:

**£18.00 including VAT and post**
(Further details available)

**Available by post from:**

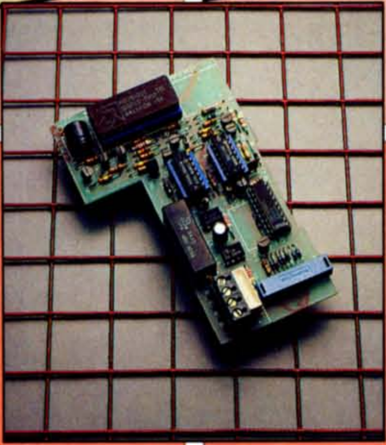
VINE MICROS, MARSHBOROUGH, NR. SANDWICH, KENT CT13 OPG.
**Telephone: (0304) 812276**
(or your local Dealer)

VISA

Access

PACE
Micro Technology

# THE BBC COMMUNICATIONS COLLECTION



## NEWS RELEASE

### OBBS Bulletin board software

Now, with OBBS and the Nightingale modem fitted with auto-answer accessory board, you can run your own bulletin board on a BBC micro. The entry level system includes many features normally only found on systems costing ten times as much. Full message searching and XMODEM uploading and downloading of software are provided along with unique colour teletext graphics and text facility. **£21.74 plus VAT**

**COMMSTAR** Nominated for the 1985 British Microcomputing award, Commstar is an outstanding piece of software. With it's powerful combination of Viewdata and ASCII terminal capabilities, Commstar is probably the only communications software you will ever need.

Developed specially for the BBC in an 8K eprom, Commstar once fitted, is always ready to use. Although it is unusually versatile Commstar is also very easy to use. Full advantage is made of the BBC's function keys and a comprehensive manual describes each of Commstar's features in simple terms. In addition to preprogrammed functions, items such as logon strings and passwords can be placed under the function keys to facilitate automatic access to the vast range of services which are available. When used in conjunction with the Nightingale modem or other multi-standard modems, Commstar opens up a host of possibilities. Did you know that you could access your bank account from your own home or search British Lending Library's records through their on-line system, BLAISE. Accessing Prestel for the latest news or downloading telesoftware from Micronet is just the beginning. . . .

**NIGHTINGALE ACCESSORY BOARD** This new accessory for Nightingale offers three new facilities on a single card. The auto-dialler now means that you can dial any number without using the telephone. Software designed for use with Commstar will dial a specified number or sequence of numbers once or more until a connection is established, each call being optionally monitored through a loud speaker. Any number of directories can be created and for each telephone number in a directory you may specify a series of attributes which allow Commstar to configure itself automatically for that particular system. Nothing could be easier. Any baud rate may be configured under software control including two new operating speeds 1200 and 600 half duplex which were not previously available. Finally, if you hope to set up your own database or bulletin board, the accessory board includes auto-answering.

Nightingale and accessory board, a complete solution.

**Nightingale modem £119, Accessory board £49, Commstar £29.57,**
**Commstar dialling software available on disc for £10 plus VAT**
**Commstar & Nightingale Combination £139**
All prices exclude VAT. Payment accepted by Cheque, Visa or Access.

**For further details contact:**

Pace Micro Technology
Juniper View
Allerton Road
Bradford BD15 7AG
Telephone 0274 488211
Telex 51564
International tel. no.
+44 274 4488211

Prestel is a registered trademark of British Telecommunications Plc.
Pace Micro Technology, a division of Pace Software Supplies Ltd.

# Does your BBC have a one track mind?

## True multi-tasking will put you out of your misery!

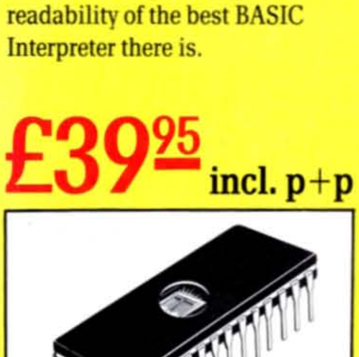
Your BBC now has the true multi-tasking potential of much bigger machines.

CMS Soft have cracked it!

This module, packaged as a ready-to-fit sideways ROM, brings you a robust system that holds its own in the most demanding industrial and laboratory conditions.

And there is no interference with normal BASIC functions; Multi-Basic enhances the power, speed and readability of the best BASIC Interpreter there is.

**£39$^{\underline{95}}$ incl. p+p**



Ordering your Multi-Basic couldn't be easier.
Either send a cheque or P.O., made payable to CMS Soft, to the address below.
Or call our 24 hour ***Priority Phone*** ☎ 0371 - 5666, stating the quantity required together with your ACCESS or VISA card number.
Your order will be processed and dispatched within 10 days.

So if you want

- full MULTI-TASKING with up to 8 background tasks running concurrent with the main program
- BBC Basic CONTROL FEATURES powerfully enhanced
- the ability to run REAL TIME PROGRAMS
- control of PHYSICAL INPUT/OUTPUT
- 5 real-time COUNTER/TIMERS
- 8 real-time TASK INTERVAL TIMERS
- a COMPREHENSIVE MANUAL that describes each command in detail, with many practical examples

**MULTI-BASIC is what you need**

MULTI BASIC

Enquiries and orders to:
**CMS SOFT Limited.**
Unit 18, Industrial Estate
Chelmsford Road
Great Dunmow
Essex CM6 1XG

CMS SOFT

## MIKE COOK

### comes up with the answers to readers' technical questions

# I want to connect four motors . . .

I HAVE a BBC B and would like to connect four motors with encoders to it.

I want to connect one motor at a time learning how to run it before running any more, but being able to expand with the minimum of fuss.

The controller I have needs an interface to run it with a voltage from 0-15 with a maximum impedance of 50k. Can you help? – *T. Leaman, Portsmouth.*

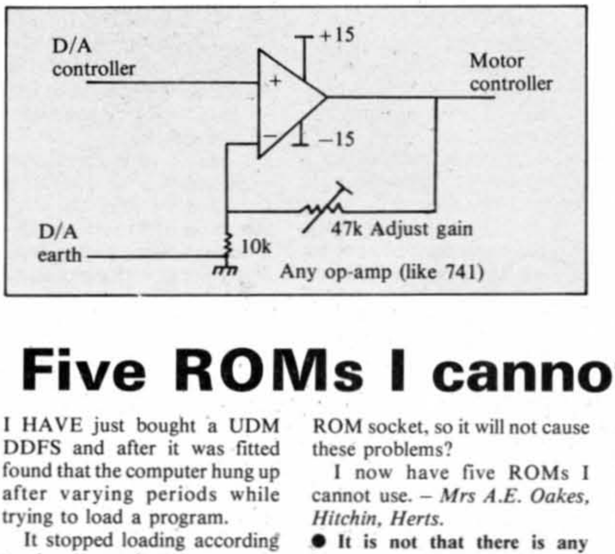
● **I am not sure from your letter what you want. If I understand correctly, you already have a motor controller which takes a varying voltage input. This is then converted into a varying motor speed. So what you need is a way of getting a varying voltage out of your computer under program control.**

**The D/A converter (*Micro User,* October and November 1984, sold as Body Build pack 17) will provide a varying voltage. However it is only 0 to 2 volts. This would need to be amplified.**

**As the impedance requirement is so high, you could do this with a simple transistor or op-amp (see circuit below).**

**As to expansion the D/A uses all 8 bits of the User Port giving an output in 256 steps, so you would need a User Port expansion board (*Micro User,* August 1984 Body Build pack 15 & 16).**

**This board will allow you to control four more D/A converters and so more motors.**



# The light that stays on

I WOULD be grateful for your advice on a problem I am having with my BBC Micro.

I connected it to TV monitor and cassette player, switched on, noticed the BBC title appear as usual, but was surprised to see the 32k characters only disappear after about 15 seconds.

I paid no attention to it and attempted to load a program. I was unsuccessful, using two tape recorders which have worked before.

I tried a number of tapes but none worked.

I then noticed that the motor light was on. I cleared the computer using Break.

When I did, the light went out and the relay indicated switching.

Once the Break button was released the motor light came on again.

Each time I depressed Break, so the light went out and came back on on release.

Being new at this game I thought that I might have triggered – goodness knows how – the motor to remain on.

I read the User Guide from cover to cover, found instructions hex's and so on – which mean nothing to me – to switch off the motor, but nothing worked.

I fear a fault requiring repair under guarantee, but wish confirmation of this.

Can you give me any advice on how to clear this problem and, if you consider it to be an electronic fault, advise me where the nearest "authorised" BBC repair facility to Liverpool/Formby is located?

PS: I disconnected TV/recorder and all leads from the computer – the light remains on, so it is within and not without. – *R.F. Willsher, Liverpool.*

● **If your computer has a DFS fitted you need to type *TAPE after each reset or power up to allow you to use the cassette recorder.**

**The cassette motor should not be on and if it is you need it repaired.**

**Unfortunately I do not know the whereabouts of a service centre. If you enquire at the place where you bought it they should tell you.**

# Five ROMs I cannot use . . .

I HAVE just bought a UDM DDFS and after it was fitted found that the computer hung up after varying periods while trying to load a program.

It stopped loading according to the screen but the cassette motor kept running.

It also gave messages such as STR$, RETURN, BAIC, BAD ADDRESS, and so on – many spelt wrongly.

On investigation it was found to be due to the Viglen ROM cartridge set I had in place.

Viglen, UDM and Microware were unaware of the incompatibility when asked.

Is it possible to fit a different piece of equipment to the cartridge where it fits into the ROM socket, so it will not cause these problems?

I now have five ROMs I cannot use. – *Mrs A.E. Oakes, Hitchin, Herts.*

● **It is not that there is any incompatibility inherent between the two devices – it is simply a matter of bus loading.**

**You see, whenever you add anything to extend the length of the address and data bus the signals on them changes.**

**Imagine them as long corridors. There will be a certain echo in them. If you add on more corridors, the nature of the echoes changes.**

**Eventually the echoes combine and mix so you can't understand what is going on. It is exactly the same with electrical signals. They suffer from reflections at impedance discontinuities that can interfere with the signals.**

**As there is a "bit of slack" in most computers you can get away with one or two devices extending the bus, but a time will come when it will collapse.**

**This will vary from machine to machine, so you might find this combination might not cause other machines to fail.**

**Some people have reported successful cures by replacing the 6502 processor with the faster 6502C, but I remain to be convinced why that works.**

**I am afraid there is no simple solution – sorry.**

# Chip is a block

AS an enthusiastic owner of the BBC-B, I would like to ask your advice about the following problem.

It seemed to me that next to the perfectly-working sidewise ROM-RAM board (ISS4) from ATPL the speech upgrade kit from Acorn doesn't feel happy.

Putting on the machine, a tone is heard and that is all!

Most of the time the normal start-text has disappeared and the keyboard seems disabled.

Even a hard Break has no influence on the take-over of the speech processor.

Touching the pitch-control VR2 sometimes stops the sound, brings back the start-text and the control over the keyboard for only a couple of seconds.

In my opinion it is a matter of capacitive influence and an extra

→

From Page 99

capacitor might be needed anywhere.

Connecting the Edgecard socket by the lead makes things worse. – *E.L. Steens, Waalwijk.*

● **First take all your extra chips out – this might be the trouble. I have heard that Disc Doctor in particular is prone to stopping Acorn products from working.**

**It is probably one of these chips using the space the speech system needs and not any influence of the board itself.**

**The effect of VR2 could be due to you stopping the oscillator temporarily and in effect electrically removing the speech system.**

## Loading problems . .

I OWN a BBC Model B 1.2 OS and am having problems with loading (300 baud I think).

Not all games fail to load – just the ones that use 300 baud rate.

The first few sections work fine, but is is after the instructions and music that problems occur.

The final program is not "picked up" and my BBC Micro carries on as though the tape was blank.

My Acorn data recorder is not faulty and neither are the tapes or leads.

I have tried the tapes (all originals) along with recorder and leads on a friend's BBC Micro and also at school, where they load first time.

I think the problem could be in the cassette and RS423 circuit, although that is only a guess. – *Philip McCabe, Hindley, Wigan.*

● **This sounds like you are the victim of incompatibility between protected software and the new serial ULA logic chip.**

**Acorn have changed the design of this slightly (for some reason). The result is that it is much more fussy about the tones it receives.**

**Some protected software used the tolerance of the earlier system to pull some protection tricks. This is now not recognised by the new system.**

**I have come across the problem with some Pace software.**

**The remedy is to send the software back, saying that you have this new ULA and could they supply it in a compatible form.**

## POWER FOR THE ROBOT

I WISH to incorporate my BBC Micro into a robot floor polisher, as I do not want to have a mains or command lead going to or from the computer.

I intend to power the BBC directly from a set of lead acid cells – 1 x 12v at 50ah, 3 x 2v at 40ah.

However each cell provides about 1 volt extra – for example a 2v battery actually gives 3v.

I know the following items:

I need a +12v, +5v, –5v.

There are six leads which make themselves obvious to me – 3 x 0v, 1 x +12v, 1 x +5v, 1 x –5v.

What I don't know:

Is there an equivalent for a 7805 & 7812 which will handle 3 amps?

How do I get –5v regulated at the required number of amps for a BBC Micro?

Are those six leads the only power connections? For example are there any hidden leads under the PCB or which are internally connected? – *D.N. Croll-Stark, Edinburgh.*

● **There are seven power leads going to the main board. All the black ones are 0v and all the red ones are +5v. On my machine the other wire is purple – it might be different on yours – and carries –5v. This is located at the left hand side of the board.**

**You do not need +12v to power the computer, but you will need it if a disc drive is to be driven as well.**

**The –5v will draw about 50mA and is only required for the audio amplifier – bleeps – and the RS432.**

**If you do not want these features then it can be left disconnected.**

**It is best being derived from a separate Ni-Cad rechargeable battery. There are no other power leads.**

**Voltage regulators you could use: LM323K-STEEL +5v at 3A. UA78H05SC +5v at 5A. UA78H12SC +12v at 5A.**

## Lost lines

I FIND as I make progress with my programming skills some very quirky behaviour from my BBC Micro with its Cumana 40 track disc drive.

It will not print a numeric variable in position TAB(0), it always prints this in about position TAB(6). As I use my computer a lot for columns of figures I have to use STR$(X) if I want to print in this position.

I sometimes find when programming that I lose the last line that I entered. I now always check the listing for this fault before running the program.

I have experienced great difficulty when writing random access programs. I very often get "Type mismatch" messages even when the program has been running successfully through a loop many times.

I have sometimes found that inexplicably I have lost the entire contents of a file.

I think I should explain that I have diligently set the file pointer to coincide with the field and record lengths and am cognisent of the differing byte lengths of real, integer and string variables. *W.J. Hicks, London SE.*

● **The TAB will move the printing position along. If this position has already been passed then TAB is ignored. Basic reserves six characters in front of a decimal point for a number so you are already past this point TABing from 0 to 6.**

**As you say, you can use a string or you can change the format of the numbers by using the variable @%. This is documented in the User Guide.**

**Losing the last line happens when using AUTO line numbering and you press Escape without pressing Return. Always press Return before Escape.**

**Your "Type mismatch" error is almost certainly a result of your programming and nothing to do with the disc drive. Although exactly what is hard to tell.**

## Stay serial

I HAVE the use of a Star printer which has a serial interface. Is it possible to easily modify it to a parallel interface for use with the BBC Micro? – *G. Burford, Amersham.*

● **You can't easily modify a serial printer for parallel operation, but why not use the BBC Micro's serial output? You will find details on page 406 of the User Guide.**

## Backup copies

I HAVE not had my BBC Micro very long but have had to send it back for a loose connection or whatever with the RGB socket.

While it is away, I have asked for the disc interface to be fitted and then my next outlay will be for a disc drive.

I have just received some back numbers of *The Micro User* and on page 28 of the September 1983 issue mention is made of taking backup copies of the disc as a wise precaution.

In order to protect one's programs by taking copies, is a dual disc drive necessary, or can this be achieved with one disc drive, as a dual is almost twice as much as a single drive? – *W.P. Coles, Newton Abbot, Devon.*

● **You can take backup copies using a single disc. The computer will prompt you when to change discs, with the messages to insert the source disc and insert the destination disc.**

**With a single system it is best to make a copy of just the program rather than the whole disc as it is quicker.**

**Making a backup of the whole disc will involve about five disc swaps.**

**IF you have a technical query for this page, send it to Mike Cook, *The Micro User*, Europa House, 68 Chester Road, Hazel Grove, Stockport SK7 5NY.**

**Letters on other subjects should be sent, as usual, to Micromail, which this month starts on Page 175.**

*Creative Sound on the BBC Microcomputer Model B*
*By David Ellis and Chris Jordan*
*Acornsoft Publications*

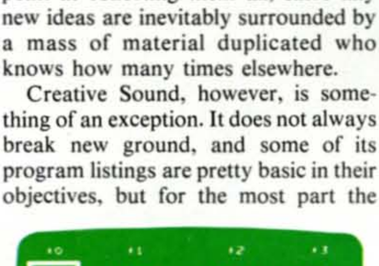
# Delve into the depths of sound synthesis

**IF weight of printed matter is anything to go by, music on the BBC Micro has never been healthier. We're currently being showered with publications on the subject.**

So far this year there have been at least four major (thick) and several minor (thinner) books, and countless columns in magazines.

Most of these publications contain something different, though not necessarily anything terribly inspiring. But unless you're a fanatic, there seems little point in collecting them all, since any new ideas are inevitably surrounded by a mass of material duplicated who knows how many times elsewhere.

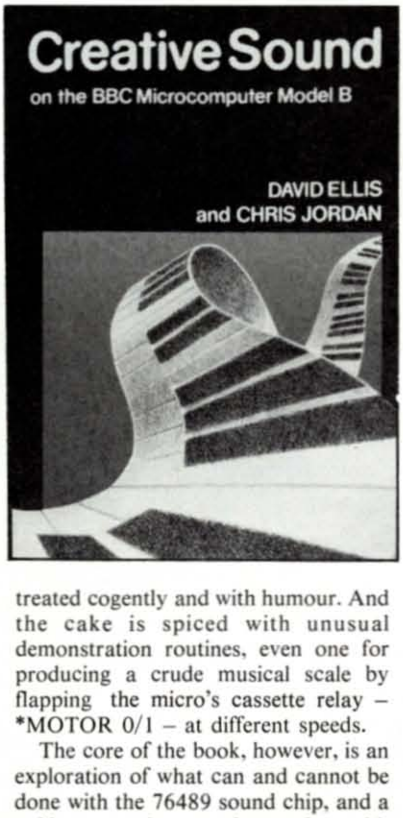
Creative Sound, however, is something of an exception. It does not always break new ground, and some of its program listings are pretty basic in their objectives, but for the most part the book is targeted at a sector of the market not previously fully catered for.



Primarily it is intended for those with some musical knowledge who want to delve into the very depths of sound synthesis on the BBC Micro, to know why and how things are happening, rather than being content with just hearing the results.

On the whole, therefore, it is not a book for the faint-hearted, but it makes fascinating reading if that sort of thing turns you on, even in a dilettante way.

The opening chapters deal with the history and the physics of digitised sound. Waveforms, Fourier-synthesis and harmonic theory are not everybody's cup of tea, but here they are treated cogently and with humour. And the cake is spiced with unusual demonstration routines, even one for producing a crude musical scale by flapping the micro's cassette relay – *MOTOR 0/1 – at different speeds.



The core of the book, however, is an exploration of what can and cannot be done with the 76489 sound chip, and a guide to creative experimentation, with the emphasis on producing the unexpected as much as the expected.

The exploration begins with an overview of the dreaded SOUND and ENVELOPE statements. One of the book's authors, Chris Jordan, is the man who originally designed them – and also, incidentally, Ample, the music programming language used on the Acorn 500 synthesiser (*The Micro User*, August 1985) so we might have expected an authoritative and detailed examination of them.

But no. So much has already been written about them that the authors rightly decided to give that one a miss, and concentrate on putting them into their proper musical context. In other words, to start one rung up the ladder, but to go further than other books on the subject. And they do.

They use the SOUND and ENVELOPE statements as the building blocks for creating far more interesting things – pre-set and programmable synthesisers, multi-oscillators, real time multi-track recorders, compositional and sound effects devices, tune generators and so on.

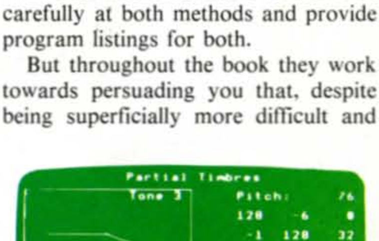
There are pages and pages crammed with imaginative, and occasionally brilliant, routines leading up to a chapter entitled "Composer's Assistant". Here all the strands are brought together to form a valuable mini-manual of aids to musical creation.

A final chapter on teaching music, ear training and testing musical ability is less innovative, but equally competent.

Once above the level of SOUND and ENVELOPE statements, there are two basic ways of entering note information on a computer. One is to use a Music Composition Language (MCL), and the other is real time input via a synthesiser keyboard, or via the micro's keyboard pretending to be one.

The authors of Creative Sound look carefully at both methods and provide program listings for both.

But throughout the book they work towards persuading you that, despite being superficially more difficult and less interactive, MCL is the real answer.



By the time they've finished it is hard to disagree with them about the

→

From Page 101

superiority of MCL, and if they are right this has wide implications for the future of computerised music.

But whatever the future, following the arguments, and trying out the demonstration listings, teaches you a great deal about the *present* mechanics of note input.

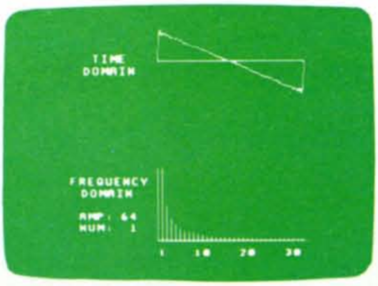
The book contains more than 30 listings, from graphic displays of all kinds to musical games and composition aids. None falls below the high standard set by the surrounding text, and some transcend it.

An efficient compiler, for instance, will run your own data, or the wide range of data provided entered in an original, relatively simple and very flexible format.

A sound demonstrator and an envelope demonstrator, which allow you to test interactively the effects of parameter changes, take all the grind out of the SOUND and ENVELOPE statements at one fell swoop, and in fact are just about the best examples of their kind that I've seen.

Even more impressive is a clever graphic envelope display, which plots out the shape of an envelope as it is sounded, making the ENVELOPE statement suddenly come alive.

Many music editors will do such things, but generally rather mundanely. And none that I know are specifically designed, as these routines are, to give an insight into how sound is made, or to allow – and encourage – you to experiment with new methods of handling musical data. It is clear that the best of the program listings could successfully have been marketed independently as a musical toolkit at more than the price of the book, £9.95.



No doubt for this reason, and to save laborious typing and unavoidable debugging, Acornsoft has made them all available on cassette (£5) and two 40 track discs (£8 the pair). The extra expense is well worth it.

One final point – and something which rarely gets a mention in book reviews – is that Creative Sound's 320 densely-packed pages are printed in a clear typeface, with examples, graphs and listings offset in brown for easy reference. Not an unimportant consideration, given that this is the kind of publication which will tend to be read and re-read many times over.

In all then, a nicely produced, readable, informative, challenging and above all creative book. It is certain to become one of the standard works on BBC Micro music.

**Gabriel Jacobs**

EPROMS + RAMS

Hitachi 250nS – the reliable ones – BBC compatible.
Prices include VAT and UK post – normally by return.

**27128** 1-2 pcs **£3.75**, 3-9 pcs **£3.50**, 10+ **£3.25**
**2764** 1-2 pcs **£2.75**, 3+ **£2.50**

**RAMS** – Hitachi Low Power 150nS
**6264 LP15** 1-2 pcs **£4.75**, 3+ **£4.50**

** If you see a lower price we will beat it **

**BB-PROM** Programmer **£33.95** inclusive
**ERASERS:-** D1 **£21.95**, D2 (15 min timer) **£26.50**
* 25% off EPROMS ordered with BB-Prom or Eraser *

Send UK cheques/Money Orders/Official Orders to:
**SILICON CITY, Dept M**
**1 Milton Road, Cambridge CB4 1UY**
ACCESS/VISA orders, telephone 0223 312453

**NEW LOW PRICES**

| | |
|---|---|
| 74LS00 | 25p |
| 74LS10 | 25p |
| 7438 | 40p |
| 74LS123 | 60p |
| 74LS163 | 60p |
| 74LS244 | 75p |
| 74LS393 | 75p |
| 4020 | 60p |
| 4013 | 50p |
| LM324 | 45p |
| BBC/Centronic Printer Cable | £8.00 |

**All Prices include VAT and P&P**

**EPROMS**
**BBC COMPATIBLE**

| | |
|---|---|
| 2764-250ns | £2.60 |
| 27128-250ns | £3.60 |
| 4164 | £1.00 |
| 6116LP-3 | £2.60 |
| 6264LP-15 | £4.50 |
| 8271 | £39.50 |

***FLORA ELECTRONICS***

*14 Lever Street*
*Piccadilly*
*Manchester M1 1LN*
*Tel: 061-228 3553*

*Fancy yourself as a*

FLEET STREET
CITY OF LONDON EC4

Editor

*Forget the rest, wait for the best from*

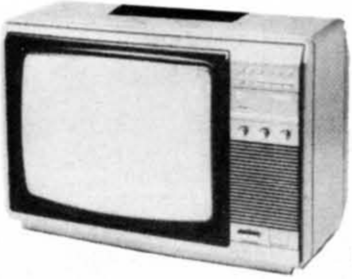
MIRRORSOFT

**Mirrorsoft Ltd, Tel: 01-377 4837**

# CARE ELECTRONICS

UNIT 14, PEERGLOW INDUSTRIAL ESTATE, OLD'S APPROACH, TOLPITS LANE, WATFORD, HERTS.
☎ TELEPHONE: 0923 777155 ☎

ELECTRON & BBC MICRO USER SHOW
**See us on Stand ... 111**
**New Horticultural Hall,**
**Greycoat Street, London SW1**
**November 14-17, 1985**



**PHILIPS COLOUR TV/MONITORS 80 CHARACTERS PER LINE**

**★★ FREE**
LEADS SUPPLIED FOR USE WITH BBC

**★★ SUPER VALUE**
MONO
ANTI-GLARE SCREEN
HIGH RESOLUTION
GREEN MODEL BM7502
@ **£81.65a** Inc. VAT

**★★ SUPER VALUE**
AMBER MODEL BM7522
@ **£81.65a** Inc . VAT

**MEDIUM RESOLUTION**
14" MODEL 14CT2006 **£230.00a** Inc. VAT

**REMOTE CONTROL**
14" MODEL 14CT2206 **£258.06a** Inc. VAT
16" MODEL 16CT2216 **£302.45a** Inc. VAT
16" DELUXE STEREO, TELETEXT, RGB, full I.R. Remote @ **£345.00a** Inc. VAT

We can supply up to 26" TV/Monitors – please ring for details.

**HAVE YOUR 14" & 16" PHILIPS, PYE or FERGUSON TX COLOUR TV CONVERTED TO A TV/MONITOR**

**RGB CONVERSION KIT**
**@ £44.85d**

- ★ Resolution better than 585 × 450 pixels.
- ★ Image clarity comparable to leading monitors.
- ★ Includes RGB lead for connecting with BBC.

**READYMADE LEADS:**

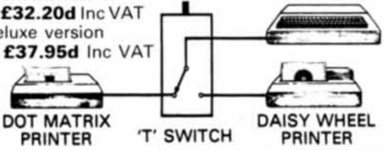
| | |
|---|---|
| RGB 6 pin DIN | @ 2.99c Inc |
| RGB 6 pin to 7 pin DIN | @ 4.14c Inc |
| RGB 6 pin to SCART | @ 7.82c Inc |

**REMOTE AND STANDARD TV'S MODIFIED IN HOUSE**
**@ £58.65a**

**COMPUTER/PRINTER SELECTOR 'T' SWITCHER**

- 26 pin as BBC
- 2 printers to 1 micro
- 1 printer to 2 micros

Standard version
@ **£32.20d** Inc VAT
Deluxe version
@ **£37.95d** Inc VAT



## THE CARE LOW PROFILE ROM MODULE SYSTEM

**FOR THE BBC MICRO**

DEALERS ENQUIRIES WELCOME

**Don't run the risk of damaging your ROMS/EPROMS or your BBC Micro. Whenever you want to remove ROMS/EPROMS from your BBC. Fit our Low Profile Rom Module System and save your collection of ROMS/EPROMS in our specially designed cartridges. The CARE LOW PROFILE MODULE SYSTEM has been designed not to take any power from your BBC Micro and allows you unlimited ROMS/EPROMS.**

**COMPONENTS! WIDE RANGE AVAILABLE**

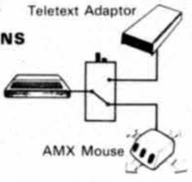
| | |
|---|---|
| Acorn Disc Interface | @ 73.60c Inc VAT |
| Eprom 2764 250ns | @ 4.14c Inc VAT |
| Eprom 27128 250ns | @ 6.90 Inc VAT |

**Changing Leads is a thing of the Past!**
**USER PORT SWITCHER**

**THREE SWITCHED POSITIONS**

- 20 pin as BBC
- 1 micro to 2 user port units

@ **£33.35d** Inc VAT



- ★ **Unlike other systems:**
  - ★ Won't get in the way when using the Keyboard.
  - ★ Stops damage caused by shortcircuit due to metal objects e.g. paperclips falling inside.
  - ★ Prevents damage caused by dust.
- ★ **Edge Card Socket** which takes all the wear, Gold Plated for extended life.
- ★ **FOR THE AMATEUR AND PROFESSIONAL USER**
- ★ **MANUFACTURED ENTIRELY IN THE UK.**
- ★ **Each System Contains:**
  - ★ 1 Low Profile Assy. ★ 1 ROM Cartridge.
  - ★ 1 Library Rack 6 way. ★ 5 Blank Labels.
- ★ **Prices including VAT.**
- ★ Complete Module System @ £14.95d
- ★ Spare Cartridge @ £2.76c
- ★ Library Rack to store 6 Cartridges @ £1.84c
- ★ 5 Cartridges @ £12.95c ★ 10 Cartridges @ £23.00c

**Dual Power Supply Units for Disc Drives**

- ★ Colour finished to match BBC Micro.
- ★ Comes complete with moulded mains lead
- ★ 6 pin BBC outlet or Dual power leads for disc drives. (Please specify when ordering).

**High Rated @ 33.35b Inc VAT**

CARE ELECTRONICS

Prestel No. *5995007#
Viewdata No. 0923 777155

TEL: 0923 777155

*If you require further details on any of the above, please write or 'phone for our comprehensive catalogue.*

**HOW TO ORDER:**

By Post. Enclose your Cheque/P.O. made payable to **CARE Electronics.**
Or use your ACCESS. Allow 7 days for delivery. Please add carriage.

OPEN
9am-5pm MON-THUR
9am-4pm FRI/SAT

a) @ 8.00
b) @ 5.00
c) @ 1.00
d) @ 2.00

# "Products worth shouting about from Cumana!"

CUMANA
DISK DRIVE GUI

**DISK DRIVES** Cumana, Europe's leading supplier of floppy disk drives and the only manufacturer to date to win BEAB approval to BS415 for electrical safety, now have an even wider product range than ever before – whether for the BBC, Spectrum, QL, Amstrad, Apple, Enterprise, Dragon, Tandy, Electron, Oric Atmos, Cumana have the best quality drives available.

**UPGRADE** But Cumana's range now covers much more than just disk drives; there's a growing range of exciting new computer products designed to uprate and extend the uses of the most popular micros. Products like the Cumana Upgrade – a major expansion to the BBC and QL micros, enabling real-time minicomputer performance with .5Mb of RAM and high level applications software. 10Mb and 20Mb Winchester systems are available for both the QL and BBC using Upgrade.

**TOUCH PAD** There's the new, improved Touch Pad graphic input device with powerful Screen Artist software – an infinite variety of graphic design or artistic uses for the home, business or education, taking you another step towards the professional league. Ask us about the new Touch Pad library!

**SOFTWARE** Also new and exclusive to Cumana is Pocket Wordstar – a full implementation of Wordstar & Mailmerge, the industry standard word processing package. Thanks to Cumana, it's now available to you, at a price within every users pocket.

Cumana the very best name in memory.

# "And so are the prices!"

## CUMANA COMPUTER PERIPHERALS – THE VERY BEST QUALITY AT THE MOST COMPETITIVE PRICES.

3", 3½" + 5¼" disk drives for the BBC, Spectrum, QL, Dragon, Apple, Amstrad, Enterprise, Electron, Tandy, Oric Atmos prices from **£89.95** to **£255.95** inc VAT.

Cumana Upgrade including software suite for the BBC + QL from **£795.95**.

QFS (double density disk interface for BBC-B) **£79.95**.

Cumana Touch Pad **£69.95** inc. VAT.

Additional Touch Pad Software from **£4.95**.

Pocket Wordstar **£119.00**.

5¼" double sided double density diskettes (10) **£24.95**.

3½" double sided double density diskettes (10) **£39.95**.

Cumana disk interface for the Electron (double density) **£74.95**.

All prices are inclusive of VAT.

## CUMANA DISTRIBUTORS

CEM Micro Computer Services (Belfast) 0232 24411,
Silicon Express (Leicester) 0533 374917
Thompson Cook (Birmingham) 0527 25000,
J.S. Simnett (Kingston-upon-Thames) 01-541-1495,
Microworld (Edinburgh) 031-557-4196,
Hugh Symonds (Bournemouth) 0202 26535,
Eltec (Bradford) 0274 722512.

CUMANA®
*The best name in memory*

CUMANA LTD., PINES TRADING ESTATE, BROAD STREET,
GUILDFORD, SURREY, GU3 3BH. TEL: (0483) 503121

# Monitors

## Philips CT2007

**TV/Monitor**

*(Ask for a data sheet)*
with BBC cable
**£215.00** (£186.96 + VAT)

| | Ex VAT | Inc VAT |
|---|---|---|
| Philips BM7502 Green Monitor | 68.70 | 79.00 |
| Philips BM7522 Amber Monitor | 72.61 | 83.50 |
| Kaga/Taxan KX1201 Green Monitor | 88.70 | 102.00 |
| Kaga/Taxan KX1203 Amber Monitor | 101.70 | 116.95 |

## *BBC SPECIAL OFFERS*

| | Ex VAT | Inc VAT |
|---|---|---|
| BBC B & Acorn DFS | 312.17 | 359.00 |
| BBC Plus | 390.44 | 449.00 |

## TAXAN KP810

with BBC cable & paper
**£268.00** (£233.04 + VAT)
*(Phone to check price)*

| | Ex VAT | Inc VAT |
|---|---|---|
| KP910 17" width printer | 328.70 | 378.00 |
| KP810 Paper roll | 3.43 | 3.95 |
| KP810 Dust Cover | 4.00 | 4.60 |
| KP810 Print ribbon | 5.48 | 6.30 |

## PRINTER PACK 2 for BBC Micro

Screen Dump ROM, View Printer printer, 2m cable, mains plug .......... £14.95 inc. VAT

## LX-80 *(EPSON)*

with BBC cable & paper **£229.00** (£199.13 + VAT)

| | |
|---|---|
| Tractor Unit | 20.95 (18.22 + VAT) |
| Sheet Feeder | 59.00 (51.30 + VAT) |
| Printer Ribbon | 4.49 (3.90 + VAT) |

## SP-1000 *(SEIKOSHA)*

with BBC cable & paper .......... **£215.00** (£186.96 + VAT)

## PRINTER RIBBONS

| | | |
|---|---|---|
| Epson MX, FX, RX/80 | 3.02 | 3.47 |
| Epson LX80 | 3.90 | 4.49 |
| Canon PW 1156A/1080A | 5.48 | 6.30 |
| Juki 2200 Correctable | 2.12 | 2.44 |
| Juki 2200 Fabric | 3.60 | 4.14 |
| Juki 6100 Multi-strike | 2.16 | 2.48 |
| Juki 6100 Single-strike | 1.32 | 1.52 |
| Kaga/Taxan KP 810/KP910 | 5.48 | 6.30 |

15% discount on Quantities of 12+

## EPROMS, RAMS, 8271 etc.

***(Phone for quantity discounts)***

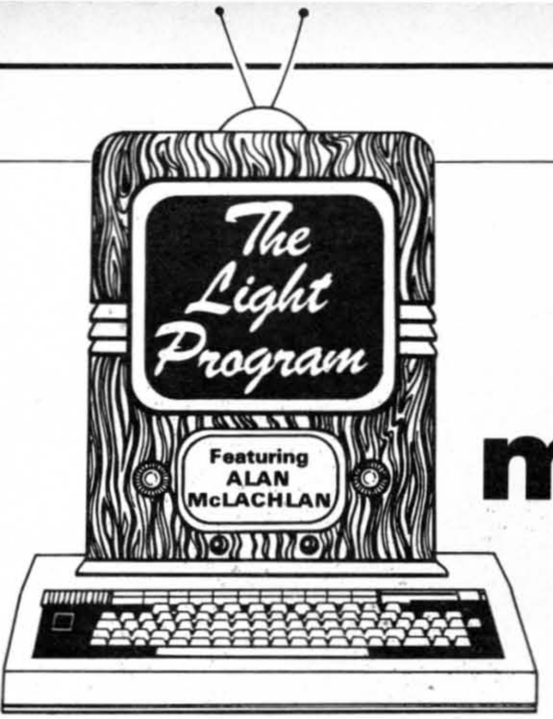
| | Ex VAT | Inc VAT |
|---|---|---|
| 27128 Hitachi 250nS Eprom | 3.04 | 3.50 |
| 2764 Hitachi 250nS Eprom | 2.09 | 2.40 |
| 6264LP-15 8K x 8bit Ram | 4.30 | 4.95 |
| 8271 Floppy Controller | 40.00 | 46.00 |
| Disc CMOS/TTL Chips | 4.77 | 5.49 |
| Acorn Disc Interface | 60.00 | 69.00 |
| View Wordprocessor Rom | 41.74 | 48.00 |
| Wordwise Plus Rom | 41.74 | 48.00 |
| Printmaster Rom | 23.91 | 27.50 |
| Inter-Sheet Rom | 42.61 | 49.00 |

*(Full range of Roms available)*

***Phone for our best price before placing your order***
*EDUCATIONAL & GOVERNMENT ORDERS WELCOME*
All products have a 12 month no quibble guarantee
Prices subject to variation without prior notification
Carriage 46p (40p + VAT) Securicor £6.90 (£6.00 + VAT)

WeServe

**Micro Dept.**
**128 West Street,**
**Portchester, Hants.**
**PO16 9XE.**
**Tel: 0705 325354**



# Expanding my horizons

### First part of ALAN McLACHLAN's venture into writing a more ambitious games program

**MY expeditions over the last months into the world of the games programmer has generated an enormous amount of interest from our readers.**

It seems that whether you're young or old, an absolute novice or reasonably proficient, there are many of you who want to have a go at writing at least one simple game in your computing career.

Smiley Hunt was simple in concept and format – it had to be for me to write it. Now I've decided to use the same basic ideas in another mega-production, expanding them slightly to introduce some different, perhaps more interesting, routines.

The principle of the X,Y coordinate grid we'll retain from the last game, but this time, so that we can incorporate some interesting graphics on-screen, we're going to create a variation called Sub Hunt.

The idea is to have a boat dropping depth charges to try to destroy submarines hidden from view beneath the sea's surface. We will move the boat left and right keeping track of the movement in a variable for its X coordinate. This is something we didn't do in Smiley Hunt, and will involve moving a graphics character across the screen.

The depth for the charge we will input from the keyboard, just as we did with the Y coordinate in Smiley Hunt.

Right, let's get started. Once again the first thing to do is make a list of tasks that we want the program to carry out.

I wrote them down on paper initially, but to save time I've moved on from that and given each a line number, and a procedure name that describes what it does.

Two REPEAT ... UNTIL loops have been added to control the game. The first creates a loop allowing you to play any number of games until a state of 0 or FALSE exists.

As everything is –1 or TRUE until we say it isn't, the game will go on until we choose to stop it, or in other words the condition is FALSE.

The second loop brings each game to an end when certain conditions are met. These conditions can be altered if you so desire. In this version the end comes when either you have destroyed five submarines, or used up 30 mines.

Listing I is, in fact, the whole game in a nutshell. Granted the meat is missing, but all we have to do now is write each procedure to carry out the task required of it.

```
10 REM Sub hunt
20 MODE2
30 PROCtitle
40 PROCinit
50 REPEAT
60 PROCstartup
70 PROCscene
80 PROCsubs
90 REPEAT
100 PROCmove_boat
110 PROCinput
120 PROCbomb
130 PROCcheck
140 UNTIL subs>4 OR mines>29
150 PROCfinished
160 PROCresults
170 UNTIL FALSE
```

*Listing I*

We're going to have a full title screen this time and this is the first procedure called at line 30 after we have set the Mode at line 20.

DEFPROCtitle consists simply of two FOR ... NEXT loops to print out two rows of asterisks, and two PRINT statements to put the title on the screen.

After "Al's" is printed, the words "Sub Hunt" are put into the string B$. The MID$ command at line 290 then strips off each letter, one at a time, and prints it across the screen in a random colour accompanied by a simple scale of music. The notes for the scale are held in the DATA in line 1640.

We also make use of two short delays and these are defined in DEFPROCdelay.

Type in Listings II, III and IV then enter the dummy line 35:

```
35 GOTO 35
```

Run the program and if you have typed the procedure in correctly you should see a title screen displaying "Al's Sub Hunt" between two rows of asterisks.

The screen should clear to black after a short delay, at which point you can press Escape. List the program and if all's well we can add the next procedure.

Called by line 40, DEFPROCinit initialises all the items that only need to be set up once in our game. It was here in setting up a two-dimensional array to hold the grid, as last time, that I encountered problems.

```
  180 REM************************
  190 DEFPROCtitle
  200 VDU23;8202;0;0;0;
  210 CLS
  220 COLOUR1:FOR x=2 TO 16:PRINTTAB(
x,8);"*"
  230 NEXT x
  240 FOR x=2 TO 16:PRINTTAB(x,21);"*
"
  250 NEXT x
  260 COLOUR 3:PRINTTAB(8,12);"Al's"
  270 A$="Sub Hunt"
  280 FOR x= 1 TO LEN(A$)
  290 B$=MID$(A$,x,1):COLOUR RND(3):P
RINTTAB(2*x,16);B$:READ pitch:SOUND 1
,-15,pitch,10
  300 PROCdelay(.7)
  310 NEXT x
  320 PROCdelay(3):CLS
  330 ENDPROC
```

*Listing II*

```
 1630 REM*****MUSIC DATA*******
 1640 DATA 53,61,69,73,81,89,97,101
```

*Listing III*

```
  1460 REM****************************
  1470 DEFPROCdelay(number)
  1480 FOR delay=1 TO number*1000
  1490 NEXT delay
  1500 ENDPROC
```

*Listing IV*

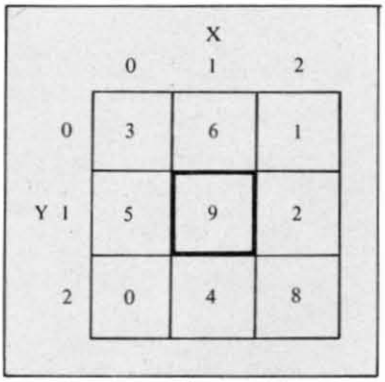
As I developed the program I quickly ran out of memory, because of the extra facilities I was adding.

The main culprit was the array which uses five bytes of memory to store each array element. As I tried to dimension a grid measuring 21×19 this accounted for nearly 2k of memory. This was in addition to the 2.75k used by the DFS, and left me with very little spare memory to play with.

I know the simple solution would have been to download the program to &E00 but I asked the lads if there was another way that would avoid this – I've never been very lucky with downloaders.

The unanimous decision – by virtue of it being the only suggestion – was to simply reserve 399 one-byte locations. This uses much less memory.

For example, in the normal course of



|  |  | X 0 | 1 | 2 |
|---|---|---|---|---|
|  | 0 | 3 | 6 | 1 |
| Y | 1 | 5 | 9 | 2 |
|  | 2 | 0 | 4 | 8 |

*Figure I: A two dimensional array*

things, a 2×2 numeric array using DIM A(2,2) stores its information in 45 memory locations. This is calculated by allowing for three elements in each dimension (0-2), and five bytes per item, giving the sum 3×3×5.

In case the 3 is getting to you, Figure I shows the elements in a 2×2 array. The numbers in the boxes are random and are of no significance.

If you wanted to know the contents of A(1,1) you would simply use the statement:

```
PRINT A(1,1)
```

to obtain the result, in this case 9.

For the purposes of my game, which only uses small numbers, we don't need such an expensive reserve of memory – one byte per number will be sufficient. This is because there's nothing going over 255, the maximum number a byte can hold.

Instead of using an array therefore, we can simply reserve nine memory locations using DIM A 3×3 as in Figure II.

I've used the same numbers as Figure I to show how they are stored sequentially in memory. However, we still need to simulate a grid, and it is not too difficult to imagine the groups of three boxes stacked under each other to form, more or less, the same arrangement as in Figure I.

Finding the contents of the same box, though, is a little more complicated. It needs a calculation based on the start address, A.

To this we must add three times the number of Y coordinates – there are three bytes in each level – plus the number of boxes along the X coordinate.

The query operator returns the contents of the box and the whole statement reads:

```
?(A+3*Y+X)
```

which translates as "the contents of the box, Y rows down, X boxes in".

You can compare the two sets of figures and see how all the numbers in the other boxes follow the plan.

In the program itself I needed to write a function DEF FNsea(x,y) to read the contents of a box, and a procedure DEFPROCputsea(x,y,n) to insert something in a box.

As these are going to be used a lot right from the start, you might as well type them in now.

```
  1560 REM*************************
  1570 DEF FNsea(x,y)
  1580 =?(sea+20*y+x)
```

*Listing V*

```
  1590 REM*************************
  1600 DEFPROCputsea(x,y,n)
  1610 ?(sea+20*y+x)=n
  1620 ENDPROC
```

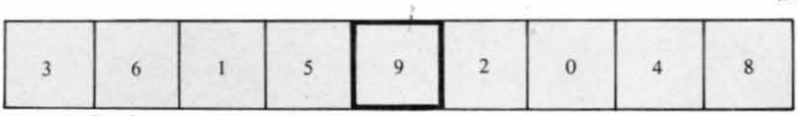
*Listing VI*

While we're at it, let's type in another procedure that we'll be using quite soon and seeing a lot of. This is DEFPROCwindow and you came across it in Smiley Hunt and therefore it should need no explanation.

```
 1390 REM**************************
 1400 DEFPROCwindow(w,sx,sy,fcol,bcol
,A$)
 1410 COLOUR fcol:COLOUR bcol
 1420 IF w=1 THEN VDU28,0,10,19,0
 1430 IF w=2 THEN VDU28,0,31,19,11
 1440 PRINTTAB(sx,sy);A$;
 1450 ENDPROC
```

*Listing VII*

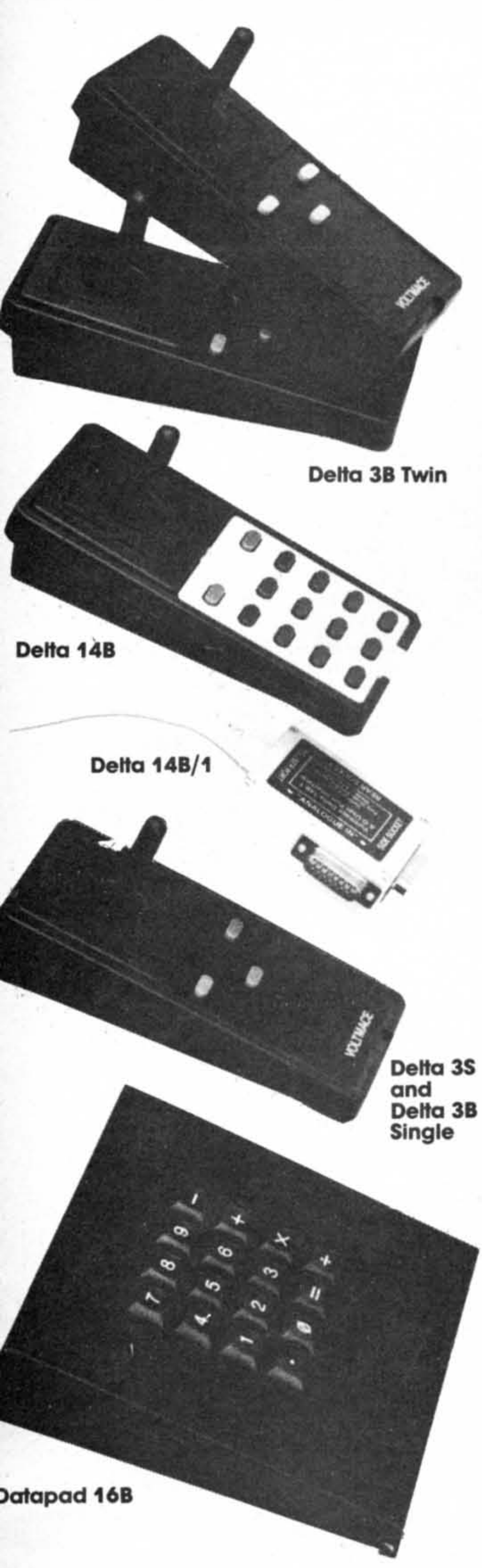
Right, back to DEFPROCinit, where we left off. We can now reserve memory



|  |  |  |  |  |  |  |  |  |
|---|---|---|---|---|---|---|---|---|
| 3 | 6 | 1 | 5 | 9 | 2 | 0 | 4 | 8 |

*Figure II: Simulating an array in memory*

# JOYSTICKS— THE COMPLETE SOLUTION



**DELTA 3B TWIN—BBC B or ELECTRON PLUS 1 £19.95**
A direct but improved alternative for the original ACORN joysticks, with 2 joysticks wired to one plug. As with all our joysticks they have the fast action sprung to centre return of the steel shafted nylon covered joystick. The light action makes them ideal to hold and the 3 fire buttons allow left or right-handed use.

**DELTA 3B SINGLE—BBC B or ELECTRON PLUS 1 £12.00**
A single joystick that in some ways can act as two. The custom made special "low noise" potentiometers are wired so that it will work as a left hand or right hand joystick. It can even run some programs written for two joysticks and has the fire buttons of both.

**DELTA 14B—BBC B £14.95**
Our original ACORN/BBC handset. The same super light joystick, but the long life buttons, which have been video game tested for many years, increased to 14 in number. A DELTA 14B/1 is needed to run the keypad but a 14B on its own will work as a joystick and fire buttons, so you can always add the 14B/1 to it later.

**DELTA 14B/1 for use with 1 or 2 DELTA 14Bs £14.85**
**DELTA DRIVER CASSETTE £5.95**
The A/D/USER PORT interface box. This gives simultaneous access to both the analogue port, for the joystick part and the user port, for the keypad. Two handsets can be plugged into the box giving a total of 24 user definable keys.
Full instructions are provided to include the keypad in your own programs even in BASIC or for the non-programmer a DELTA DRIVER cassette is available with keyboard to joystick/keypad conversions and keypad set up programs.

**DELTA 3S—ELECTRON with switch joystick interface £12.00**
For an ELECTRON with a switched joystick interface (Not a PLUS 1) this gives you the same delightful light, fast action of the DELTA joysticks but fitted with a 9 way D plug as per Atari, Commodore, etc. and will run on First Byte interface or similar.

**DELTA ASC** not illustrated **£9.95**
This little box plugs in series with your analogue joystick to alter its characteristics simply by using a switch. In one set up the joystick will act like a switched joystick, i.e. a slight movement will act as if the joystick has been pushed hard over. In the other mode the joystick only covers the centre half of the A/D converter so that it takes twice as much movement to give the same effect. This makes it much easier to make delicate adjustments to programs like flight simulators.

**DATAPAD 16B £39.95**
A commercial spec. 16 way keypad. Full travel mechanical keys with double shot moulded keycaps mounted in a low profile metal case. The keys are marked with calculator legend, but the software included allows the pad to be defined as any keys, including function keys or single byte VDU commands such as PRINTER ON/OFF. No tampering with the computer as it fits onto the user port.

Access

Available from your dealer
or direct from us

VISA

**Voltmace Limited**

Park Drive
Baldock
Herts
SG7 6EW
Telephone (0462) 894410

## From Page 107

for the grid using line 360. Line 370 switches off the cursor and in lines 380 to 420 I have defined some graphics characters to use in the screen display.

These are the front and back of the ship (224) and (225) joined together in line 430 as *boat$*, the depth charge (226), the submarine (227), and the explosion (228).

```
 340 REM************************
 350 DEFPROCinit
 360 DIM sea 19*21
 370 VDU23;8202;0;0;0;
 380 VDU23,224,0,0,0,0,0,7,255,127
 390 VDU23,225,0,0,0,0,208,240,255,2
52
 400 VDU23,226,0,0,0,24,24,0,0,0
 410 VDU23,227,0,0,16,24,126,255,126
,0
 420 VDU23,228,17,128,4,88,8,34,40,1
32
 430 boat$=CHR$(224)+CHR$(225)
 440 ENDPROC
```

*Listing VIII*

Within the first REPEAT ... UNTIL loop DEFPROCstartup is called at line 60. This contains the variables that need to be set at the start of each new game, *mines* – the number of depth charges used – *subs* – the number of submarines hit – *oldboatx* – the start X coordinate of the ship.

```
 450 REM************************
 460 DEFPROCstartup
 470 mines=0:subs=0
 480 oldboatx=10
 490 ENDPROC
```

*Listing IX*

We're now ready to actually put something on the screen. DEFPROCscene does this and is called at line 70.

We'll use the same procedure we used in Smiley Hunt to create windows and print characters on the screen – DEFPROCwindow.

I've also used the BBC Micro's MOVE and PLOT85 commands to draw and fill two triangles to simulate a coastline.

In Smiley Hunt we used the numbers 0-9 to indicate the 10 Y coordinates of the grid. Here we need more than 10, so to keep them to single characters, we are going to use the letters a-r rather than numbers. This will avoid having to print two characters side by side.

Line 580 uses a FOR ... NEXT loop to print these letters down the left-hand side of the screen. It does this by adding 97 to the variable *numy* and printing the resultant Ascii character.

The first time through the loop *numy* is equal to 0, therefore we print CHR$(97) which is a lower case "a". The next time through *numy* is 1, *numy* + 97 = 98, CHR$(98) is "b", and so on to the letter "r".

We must initialise the grid so that every location contains a zero, using the FOR ... NEXT loops at line 590 and the first call to PROCputsea at line 600.

A couple of prompts on the screen will remind us at the start how to play the game, but the idea is that they won't be seen again.

```
 500 REM************************
 510 DEFPROCscene
 520 PROCwindow(1,0,0,0,134,CHR$12)
 530 PROCwindow(2,0,0,0,132,CHR$12)
 540 PROCwindow(1,oldboatx,10,0,134,
boat$)
 550 GCOL0,2:MOVE 0,672:MOVE 0,772:P
LOT 85,260,672
 560 MOVE 1279,672:MOVE 1279,720:PLO
T 85,1140,672
 570 PROCwindow(2,0,0,7,132,"")
 580 FOR numy=0 TO 17:PRINTTAB(0,num
y);CHR$(numy+97);:NEXT numy
 590 FOR locx=4 TO 18:FOR locy=0 TO
17
 600 PROCputsea(locx,locy,0)
 610 NEXT locy:NEXT locx
 620 PROCwindow(1,0,2,1,134,"Z or X
then Return")
 630 ENDPROC
```

*Listing X*

Now we're ready to have a look at what's on the screen. Delete line 35 and enter dummy line 75.

```
75 GOTO 75
```

Run the program. If you've done everything right so far, your screen should correspond exactly with Figure III. If it doesn't, you would be well advised to check your typing very carefully for mistakes before you go any further.

Line 80 calls the next subroutine at line 540. This, DEFPROCsubs, hides the submarine in exactly the same way that we hid the Smileys last time. A single FOR ... NEXT loop selects 20 random numbers for both X and Y coordinates, then places a number 1 in one of your micro's reserved memory location using PROCputsea.

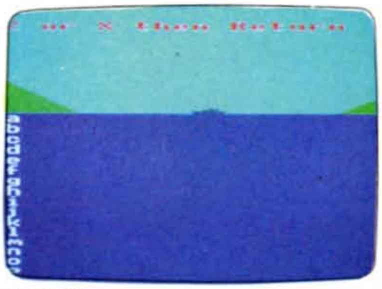


*Figure III*

Line 680 checks memory using FNsea and sends the program back to the random number generator should a memory location already have a 1 in it. This ensures that there are always 20 separate submarines hidden away.

```
 640 REM************************
 650 DEFPROCsubs
 660 FOR tally= 1 TO 20
 670 subx=RND(13)+3:suby=RND(17)
 680 IF FNsea(subx,suby)=1 THEN GOTO
670
 690 PROCputsea(subx,suby,1)
 700 NEXT tally
 710 ENDPROC
```

*Listing XI*

Now add line 695:

```
695 PROCwindow(2,subx,suby,7,132,"+")
```

remove line 75 and add dummy line 85:

```
85 GOTO 85
```

You will be able to see the locations of the submarines highlighted by the + sign, and these can be left until later as they will be extremely useful for testing out the detection routines.

This is an ideal place to break for this month – it should give you time to ensure everything is working all right in time for next month's episode.

If it isn't, don't be afraid of dropping me a line at *The Micro User*. But remember, if you want a personal reply – and this applies to anyone else writing in to us, for whatever the reason – you must enclose a SAE. We may not be able to solve your problem every time, but at least we'll admit an honourable, reluctant, defeat.

## Get your own back on that grotty green gloop with DAVID PILLING's . . .

# GLOOP

**GREEN gloop, it is generally acknowledged, is treacherous stuff. Make contact with a microscopic speck of it and before you can say, "It'll come off with a drop of meths", the walls, the floors, you, and half of Western Europe will all have been permanently marked.**

In the Super Green Gloop Gulper Game you get the chance to take revenge on all the primeval green sticky gloop you have ever encountered in your life.

Thanks to the miracles of modern microcomputing, a small quantity of green gloop has been trapped in a disused Pac Man maze, along with the only known way of disposing of gloop – the gloop guzzler.

In the game the gloop spreads out

### MAIN VARIABLES

| | |
|---|---|
| **S%()** | Array with one element for each character position on the screen. The value of each element enables the program to keep track of what occupies the corresponding screen position. The values used are as follows:<br>*S%()* = 0; an empty position<br>*S%()* = 129; gloop<br>*S%()* = 128; a piece of wall<br>*S%()* = 131; the guzzler<br>*S%()* = n with n > 0 and n < 128; node number n. |
| **X%,Y%** | x and y coordinates of the guzzler. |
| **F%** | Fuel level. |
| **U%,V%** | Point to two byte arrays which are used to store the x and y coordinates of each node. For instance the x coordinate of node *N%* is *N%?U%*. |
| **S%** | Score. |
| **HI%** | High score. |
| **GU%** | Number of guzzlers. |
| **SC%** | Number of mazes cleared. |
| **G%** | Controls the speed with which the gloop spreads. |
| **N%** | Number of active nodes. |
| **M%** | Usually the number of an individual node. |
| **U$,D$, L$,R$** | Print a guzzler going up, down, left or right. |

### PROCEDURES

| | |
|---|---|
| **char** | Defines characters and envelopes. Constructs various strings. Zeros the score and high score. |
| **start** | Sets variables to their values at the start of the game. Increments high score if necessary. |
| **screen** | Draws the maze on the screen using the information in the data statements in lines 850 to 970. *S%()* is filled in with the appropriate values at the same time. The centre of the maze is filled with gloop and the necessary nodes are created with PROCnew in line 790 using the data statements in lines 980 and 990. |
| **guzzler** | Moves the guzzler, depending on which of the cursor keys is pressed. |
| **FNFUEL** | Displays the decreasing fuel supply and prints out the low fuel warning. Returns TRUE if no fuel left or all the gloop has been eaten. |
| **d(T%)** | Produces a delay of *T%* + 1 centiseconds. |
| **gloop** | Spreads the gloop by getting the coordinates of a node and calling PROCnew on the surrounding positions. |
| **new(A%,B%)** | Creates a node at position *A%,B%*. |
| **rem(M%)** | Destroys node number *M%*. |
| **rgm(M%)** | Used when the guzzler has just eaten a node. Does the same things as PROCrem, but at the end control drops into the procedure below. |
| **gap** | When the guzzler moves into gloop new nodes must be created on the sides of the gap formed. Here PROCngw is used to do this. |
| **ngw(A%,B%)** | Creates a new node at *A%, B%* like PROCnew. |
| **game** | Prints the scores at the end of the game. Handles high scores and decrementing number of guzzlers. |
| **gloopwin** | The gloop has won. Fills the screen with gloop. |
| **guzzlerwin** | The guzzler won, print suitable message. |
| **initializeuser** | Tells you what the game is about. |

trying to fill the maze. You must try to clear it all up by deftly steering your gloop guzzler through it.

However your guzzler is constantly using fuel, so you have only a short amount of time in which to do this.

You are given three guzzlers with which to try and beat the high score. If you fail to clear a maze with the fuel provided you lose one of them.

Points are awarded for the quantity of gloop devoured. As the game progresses from one maze to the next the speed at which the gloop spreads increases.

The guzzler is steered around the maze by pressing the appropriate cursor key. However you may change the INKEY numbers in lines 1020 to 1050 so that control is provided by different keys.

Winning at this game calls for a certain amount of strategy, in addition to speed at pressing the right keys. If you let the gloop break up into lots of small patches you will never win. Instead, try to contain it in one big patch.

Long runs through continuous areas of gloop are also recommended.

The problem the game presents from a programming point of view is the spreading of the gloop. This is achieved by using the idea of nodes – a character position on the screen that has just been filled in green.

The program keeps a list of the x and y coordinates of such nodes. When it is desired to spread the gloop a node is taken at random from this list and the four character positions around it are inspected.

If these contain the guzzler, walls or gloop, nothing is done. However if a position is empty a new node is created there. Finally the original node is destroyed.

The position occupied on the screen remains filled in with green. The nodes, therefore, do not represent all the gloop, rather they keep track of its spreading edge.

When the guzzler has moved through some gloop new nodes must be created on either side of its path.

Also if the guzzler eats a node this must have its coordinates removed from the list.

The program can tell if all the gloop has been eaten by looking to see when the number of nodes is zero.

The use of byte arrays – and therefore the use of the ? operator – means that it is probably wise to save this program after you have typed it in and before you run it for the first time.

## Gloop Gulp listing

```
 10 REM GREEN GLOOP GULPER
 20 REM (c) The Micro User
 30 MODE7
 40 VDU23;8202;0;0;0;
 50 DIMS%(19,31)
 60 DIMU%100,V%100
 70 PROCchar
 80 PROCinitializeuser
 90 PROCstart
100 MODE2
110 REPEAT
120 PROCscreen
130 REPEAT
```

*Turn to Page 168*

when it comes to upgrading the BBC micro it's got to be a tough choice
this is it
OAK

Since we launched the OAK computer range six months ago, it has proved to be the only choice when introducing the BBC micro into a hard working environment. Its success in this field has made it the market leader widely used in schools, universities, medical and chemical research, communications, security, defence and engineering. In fact anywhere that strength and reliability are required.

# OAK

### QUALITY PRODUCTS

Because of the outward looking design, the BBC Micro Computer has become one of the worlds leading computers. Its popularity is derived from its flexibility as a powerful home computer through to a personal computer widely used in science, education, commerce and industry. This flexibility has been enhanced by the vast range of add-ons that have become available - unfortunately these in themselves have created the micro's major weakness - in many cases they are self-contained units whose cases and cables require a lot of extra space in order to site the computer. This detracts from the overall value of the system.

The OAK computer range overcomes these problems as the vast majority of add-ons are capable of being housed within its own casing.

The OAK has been specially developed to be the most versatile computer system in its field.

### The OAK computer
## BASIC RANGE.

| | |
|---|---|
| **Cases Etc.** | |
| Keyboard case & ribbon data cable | £ 45.00 |
| Keyboard case & coiled data cable & adaptor | £ 59.00 |
| **Model 2** | |
| Processor case<br>Detachable keyboard case<br>Plugs, sockets and cables | £ 159.00 |
| **Accessories available for Oak Model 2** | |
| 65 watt fully regulated PSU | £ 99.00 (New) |
| Power supply upgrade kit (not required for 65 watt PSU unit; includes cables to motherboard, disc drives, fan, 2nd processor, PSU) | £ 24.00 |
| ROM socket kit | £ 18.00 |
| 2nd processor chassis | £ 8.00 |
| Disc drive blanking plate | £ 4.00 |
| **OAK Model 4** | |
| Detachable keyboard case<br>Processor case<br>Keyboard coiled data cable<br>BBC B Plus motherboard<br>BBC B keyboard<br>BBC power supply<br>Dual 100K single sided disc drives | £ 799.00 |
| **OAK Model 5** | |
| Detachable keyboard case<br>Processor case<br>Keyboard coiled data cable<br>BBC B Plus motherboard<br>BBC B keyboard, 65 watt PSU<br>Dual 400K double sided disc drives | £1025.00 |
| **OAK Model 6** | |
| Detachable keyboard case<br>Processor case<br>Keyboard coiled data cable<br>BBC B Plus motherboard<br>BBC B keyboard, 65 watt PSU<br>Dual 400K double sided disc drives<br>6502 2nd processor | £1225.00 |
| **OAK Model 7** | |
| Detachable keyboard case<br>Processor case<br>Keyboard coiled data cable<br>BBC B Plus motherboard<br>BBC B keyboard, 65 watt PSU<br>Dual 400K double sided disc drives<br>Z80 2nd processor, CP/M operating system, Word processor, Spreadsheet, Graphics, Database, Accountant, System Generator, CIS Cobol, BBC Basic (Z80) | £1395.00 |
| **Optional Extras** | |
| Econet | £ 75.00 |
| Multi function OAK modem and software | £ 135.00 |
| Fan | £ 45.00 |
| Monochrome Monitor (Illustrated) | £ 89.00 |

Models can be supplied incorporating BBC B internals from £499.00. Telephone for further details.

All prices shown above are exclusive of VAT and delivery.

Delivery (Cases and Systems) £12.00 (3 day service)
Delivery (Keyboards) £6.00 (3 day service)
Europe Insured Postage (Cases and Systems) £26.00

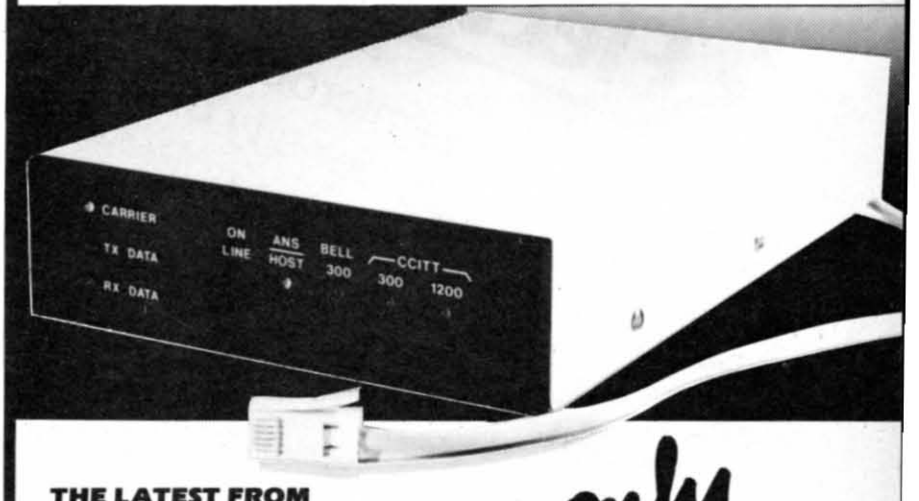
## ORDER FORM →

OAK UNIVERSAL LTD.
20 Crofters Green, Green Lane, Idle, Bradford BD10 8RR

---

# OAK MODEM

PRESTEL, MICRONET, TELECOM, GOLD, DISTEL, MICROWEB, VARIOUS BULLETIN BOARDS PLUS ACCESS TO THE MASSIVE AMERICAN DATA BASES.



## THE LATEST FROM OAK UNIVERSAL

- **Single unit with integral power supply.**
- **Style to match half height disc drive.**
- **Capable of originating and answering all modes.**
- **Auto answer and auto dial**
- **No connection required to user port - all control being achieved via RS423 port.**
- **LED indications for valid carrier, transmitted data, received data, plus mode selected, answer or originate and "on line".**
- **Easy to use.**

only **£89.95**

(plus P & P £4.00)
plus VAT @ 15%

**The Oak Modem** has been designed specifically for use with the OAK/BBC computer ranges and is £ for £ the most versatile modem, for either business or home use. **The Oak Modem** is a multi-function modem compatible with Bell 103 CCITT, V21 and V23 Standards, and is fully compatible with Termi, Communicator, Commstar and other existing software. **The Oak Modem** offers Prestel/Viewdata 1200/75 baud rates. It also offers 75/1200 baud rates so that you can communicate with other users who only have a standard 1200/75 baud rate modem., as well as 300/300 baud rates, full duplex mode for communications between OAK/BBC computers and those of other manufacturers. **The Oak Modem** has on board expansion capability, allowing auto answer and auto dial features. By employing the latest technology **The Oak Modem** requires minimal support circuitry, which results in a low power consumption, reliable quality product. **The Oak Modem** connects via the RS 423 serial port and comes complete with all cables and having been designed specifically for use with the OAK and BBC computers it is extremely easy to connect.

## HOW TO ORDER

BY POST:- To purchase any of the items simply fill in the coupon with your requirements. Enclose your Cheque/P.O. or use your Access/Visa card. Please make cheques payable to OAK UNIVERSAL LTD, and post to 20 Crofters Green, Green Lane, Idle, Bradford BD10 8RR. Allow 28 days for delivery and add VAT and Postage and Packing as stated.

BY TELEPHONE:-
Ring (0274) 614167. Credit Card holders (Access/Visa only) can purchase by telephone. Please give Card No., Name, Address and the items required.

Post to: **Oak Universal Ltd, 20 Crofters Green, Green Lane, Idle, Bradford BD10 8RR**
Please send me your dealer price list ☐ your educational price list ☐ Please send me details of your Easy Payment Credit Plan ☐
Please send me the following
I enclose Cheque/P.O. for £ ______ Cheques payable to Oak Universal Ltd. inc. P&P + VAT.
I prefer to pay ACCESS/VISA (Delete whichever is not applicable).
Card No. ______ Credit cards valid if signed by card holder. Address below must be the same as card holder
Signature
Name
Address

TEL: 0274 614167

# CUMANA

# Special Price Offer For Electron Users! .......

**Acorn electron microcomputer £94.95**

**Cumana double density disk interface £74.95***

**CS100M 1 × 40 track single sided 5¼" disk drive £114.95**

**CD200M 2 × 40 track single sided 5¼" £209.95**

**CS354 1 × 80 track double sided 3½" £109.95**

**CS358 2 × 80 track double sided 3½" £199.95**

**CS351 40 track single sided 3½" £99.95**

**CD352 2 × 40 track single sided 3½" £179.95**

**All prices inclusive of VAT + delivery.**

***Disk interface requires Acorn plus 1 expansion unit**

**ORDER FORM (ELECTRON OFFER)** MICRO USER NOVEMBER

To: CUMANA LIMITED, THE PINES TRADING ESTATE, BROAD STREET, GUILDFORD, SURREY GU3 3BH. Tel: 0483 503121.

Please Tick

I wish to order (Qty) ............ CS100M S/S 5¼" Disk Drive at £114.95 ☐ ............ CS354 D/S 3½" Disk Drive at £109.95 ☐

............ CD200M S/S 5¼" Disk Drive at £209.95 ☐ ............ CS358 D/S 3½" Disk Drive at £199.95 ☐

............ CS351 3½" S/S Disk Drive at £99.95 ☐ ............ CD352 3½" S/S Disk Drive at £179.95 ☐

............ Acorn Electron Microcomputer at £94.95 ☐ ............ Cumana Double Density Disk Interface at £74.95 ☐

I enclose cheque/PO* for ............ or debit my access/visa* card no. ............

*Delete as appropriate

NAME ............

ADDRESS ............

Tel: ............

CUMANA®
The best name in memory

MicroLink
in association with
TELECOM GOLD

No. 3 November 1985

NEWSLETTER

# MESSAGES THAT ARRIVE BEFORE THEY ARE SENT...

BELIEVE it or not – but MicroLink's subscribers in Australia can have a Telemessage delivered in England before they actually send it!

This feat of telecomputing wizardry is made possible by the speed of MicroLink's electronic mail service and the ten hour time difference between the UK and Australia's east coast.

Say, for instance, MicroLink subscriber Ned Kelly is waiting for his morning billy to boil in Sydney when he remembers with horror that it's the birthday of Liza Doolittle, the sheila he met on holiday in Earls Court, and he hasn't sent a card.

It's 5.30am Tuesday – which is 7.30 Monday evening at MicroLink's nerve centre, and half an hour before the deadline for guaranteed next day delivery of Telemessages.

Ned hastily scribbles out a few affectionate words and soon has the greeting safely transmitted to MicroLink, from where it is passed on to Liza's local delivery office.

In common with her fellow market flower sellers, Liza gets her mail very early . . . so Ned's birthday greeting arrives on a colourful Telemessage card at 5.15 Tuesday morning – half an hour before he transmitted it to MicroLink.

Even better news for Ned – because Australia is on the International PacketSwitchStream network he is able to shoot his message across 10,500 miles for the equivalent of about 15p. The MicroLink Telemessage itself costs him £1.95, plus 65p for the fancy greeting card.

So Ned's long distance romance with Liza is saved for less than £2.

# System speeds up

*SENDING a telex message overseas via MicroLink is now easier and faster.*

*Previously when a system user was asked "Tlx, Key plus or Code?" he had to access an alphabetical list of countries and read through it to get the appropriate code number of the country he was sending to.*

*Now he can just type in the name of the country, telex number, and the answer back code where appropriate, and press Return before typing in the text of the message he wants to send.*

# Church keeps in touch by telex

A MICROLINK member with a mission is Colonel K.A. Christian, who until his retirement was head of telegraph and data systems at British Telecom headquarters.

As secretary to the Deanery of Clare in the Diocese of Bury St. Edmunds and Ipswich he uses his Tandy Model 1 and Miracle Modem as often as possible to communicate by electronic mail and telex with other church officials.

And he is also a member of the Church Computer User Group, whose patron is the Archbishop of York and whose aim is to spread the gospel of high tech among church administrators.

A prime target for a telecomputing baptism is his Rural Dean, the Rev Andrew Haig, who has a Commodore 64 but hasn't yet got a modem.

"I'm hoping he'll obtain one very soon", says Col. Christian. "I can contact our Deanery Treasurer's Apple II via Prestel and I can use MicroLink's telex facility to communicate with the Diocesan Registrar.

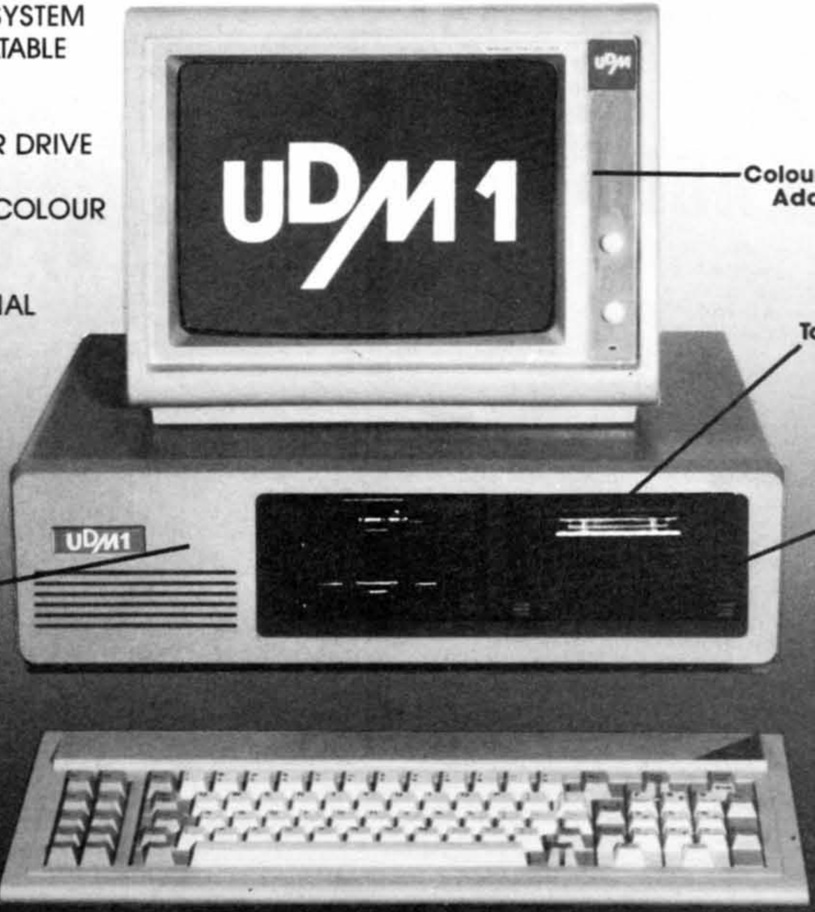
"What would really please me is for them all to be linked by the electronic mail service so we could show how telecomputing can help church administrators function more efficiently".

**YOUR chance to join MicroLink – turn to Page 117**

From £899 +Vat

# The UDM PC

- COMPLETE SYSTEM
- IBM COMPATABLE
- TWIN DRIVE STANDARD
- WINCHESTER DRIVE AVAILABLE
- MONO OR COLOUR OPTIONS
- LOW COST PROFESSIONAL SOFTWARE
- BBC DATA TRANSFER UTILITY OPTION



**Colour System**
**Add £395**

**Tape Streamer**
**Add £695**

**10 Mb**
**Hard File**
**Add £550**

**640K Upgrade**
**Add £295**

## Please Phone Your Nearest Branch

**NORTH LONDON** 637, HOLLOWAY ROAD, LONDON N19 5SS 01-281 2431
**SOUTH LONDON** 67, WESTOW STREET, LONDON SE19 3RW 01-771 6373
**MIDLANDS** 14, CHARLES STREET, HANLEY, STOKE-ON-TRENT ST1 3AR (0782) 269883

MICROWARE

IBM
Authorised
Dealer

MicroLink
Your personal passport to the world of communications with
TELECOM GOLD
Telecom Gold is a trademark of British Telecommunications p

# What it offers the BBC Micro user...

## Give your micro mainframe power

With MicroLink your micro becomes a terminal linked directly to the Telecom Gold mainframe computer, and able to tap its tremendous power and versatility. Right away you'll be able to use giant number-crunching programs that can only run on a mainframe. You can set up your own computerised filing systems, store and update statistics and other information, cross-reference material between files, selectively extract the information you want, perform massive calculations and design reports to display information from any of the files and in any format you choose.

## The biggest bulletin board of them all

The number of bulletin boards is growing rapidly. New ones are springing up in all parts of Britain and all over the world, with people of like minds chatting to each other on all manner of subjects. The only snag is that the vast majority are single-user boards – which means lots of other people are also trying to make contact and all too often all you get is the engaged tone. But with the MicroLink bulletin board there is no limit to the number of people using it at the same time. And no limit to the number of categories that can be displayed on the board.

## We're only a local phone call away

More than 96 per cent of MicoLink subscribers can connect to our mainframe computer in London by making a local phone call. This is possible because they use British Telecom's PSS system, which has access points all over Britain. A local phone call is all you need, too, for access to the international Dialcom system through MicroLink.

## Telemessages – at a third of the cost

The modern equivalent of the telegram is the telemessage, which if sent before 8pm is delivered by first post the following day (except Sunday). Originally designed for people to phone their message via the operator, the service costs £3.50 for 50 words. Now it's available via MicroLink – and costs only £1.25 for up to 350 words!

## Send and receive telex messages

With MicroLink you can turn your micro into a telex machine, and can send and receive telex messages of any length. You will be able to communicate directly to 96,000 telex subscribers in the UK, 1½ million worldwide – and even with ships at sea via the telex satellite network. Business people can now send and receive telexes after office hours, from home or when travelling. You can key in a telex during the day and instruct MicroLink not to transmit it until after 8pm – and save 10 per cent off the cost!

## The mailbox that is always open

MicroLink is in operation 24 hours a day, every day. That means you can access your mailbox whenever you want, and from wherever you are ... home, office, airport – even a hotel bedroom or golf club! No-one needs to know where you are when you send your message.

## What does it all cost?

Considering all the services you have on tap, MicroLink is remarkably inexpensive. You pay a once-only registration fee of £5, and then a standing charge of just £3 a month. On-line costs are 3.5p a minute (between 7pm and 8am) or 10.5p a minute during office hours. There is an additional 2p a minute PSS charge if you are calling from outside the 01- London call area. Charges for telex, tele-messages and storage of files are given on the next page.

# How much it costs to use MicroLink

**Initial registration fee:** £5.

**Standing charge:** £3 per calendar month or part.

**Connect charge:** 3.5p per minute or part – cheap rate; 10.5p per minute or part – standard rate.

*Applicable for duration of connection to the Service. Minimum charge: 1 minute.*
*Cheap rate is from 7pm to 8am, Monday to Friday, all day Saturday and Sunday and public holidays; Standard rate is from 8am to 7pm, Monday to Friday, excluding public holidays.*

**Filing charge:** 20p per unit of 2,048 characters per month.

*Applicable for storage of information, such a telex, short codes and mail files. The number of units used is an average calculated by reference to a daily sample.*

**Information Databases:** Various charges.

*Any charges that may be applicable are shown to you before you obtain access to the database.*

**MicroLink PSS service:** 2p per minute or part (300 baud); 2.5p per minute or part (1200/75 baud).

*Only applies to users outside the 01- London call area.*

**Telex registration:** £10.

**Outgoing telex:** 5.5p per 100 characters (UK); 11p per 100 (Europe); 16.5p per 100 (N. America); £1.15 per 400 (Rest of world); £2.75 per 400 (Ships at sea).

*Deferred messages sent on the night service are subject to a 10 per cent discount.*

**Incoming telex:** 50p for each correctly addressed telex delivered to your mailbox. Obtaining a mailbox reference from the sender incurs a further charge of 50p.

*It is not possible to deliver a telex without a mailbox reference. If a telex is received without a mailbox reference the sender will be advised of non-delivery and asked to provide a mailbox address.*
*Each user validated for telex and using the facility will incur a charge of 6 storage units a month. Further storage charges could be incurred depending on the amount of telex storage and the use made of short code and message file facilities.*

**Telemessages:** £1.25 for up to 350 words.

**Radiopaging:** No charge.

*If you have a BT Radiopager you can be paged automatically whenever a message is waiting in your mailbox.*

**International Mail:** For the first 2,048 characters – 20p to Germany and Denmark; 30p to USA, Australia, Canada, Singapore, Hong Kong and Israel. For additional 1,024 characters – 10p; 15p.

*These charges relate to the transmission of information by the Dialcom service to other Dialcom services outside the UK and the Isle of Man. Multiple copies to addresses on the same system host incur only one transmission charge.*

**Billing and Payment:** All charges quoted are exclusive of VAT. Currently all bills are rendered monthly.

## Software over the telephone

MicroLink is setting up a central store of software programs which you'll be able to download directly into your micro. The range will include games, utilities, educational and business programs, and will cover all the most popular makes of micros.

## Talk to the world – by satellite

MicroLink is part of the international Dialcom network. In the USA, Australia and a growing number of other countries there are many thousands of users with electronic mailboxes just like yours. You can contact them just as easily as you do users in Britain – the only difference is that the messages from your keyboard go speeding around the world via satellite.

## What you need to access MicroLink

You must have three things in order to use MicroLink: a computer (it can be any make of micro, hand-held device or even an electronic typewriter provided it has communications facilities), a modem (it can be a simple Prestel type using 1200/75 baud, or a more sophisticated one operating at 300/300 or 1200/1200 baud), and appropriate communications software.

---

# MicroLink

**in association with**

**TELECOM GOLD***

# Application Form

MU 11

I/We hereby apply to join MicroLink

(✓) ☐ I enclose my cheque for £5 payable to Database Publications as registration fee to MicroLink.

(✓) ☐ I also wish to use Telex. I authorise you to charge an additional £10 to my initial bill for validation.

☐ I confirm that I am over 18 years of age.

Signature

Date

I intend to use the following computer

**FOR OFFICE USE ONLY:**

Mailbox assigned

Start date

Password

**SEND TO:**
**MicroLink**
**Database Publications**
**Europa House**
**68 Chester Road**
**Hazel Grove**
**Stockport SK7 5NY.**

Name

Position

Company

Address

Postcode

Daytime telephone

**Commencement of Service**
Please indicate month of commencement
Allow 10 days for validation of mailbox

19

**Payment**

Whilst Database Publications Ltd is the supplier of all the services to you, the commission and billing thereof will be handled by Telecom Gold as agents for Database Publications Ltd.
Date of first payment to be on 15th of month following commencement.
Please complete billing authorisation form A, B or C below:

**A. Direct Debiting Mandate** *(Enter full postal address of Bank Branch)*

To

I/We authorise you until further notice in writing to charge to my/our account with you on or immediately after 15th day of each month unspecified amounts which may be debited thereto at the instance of British Telecommunications plc – TELECOM GOLD by Direct Debit. Bills are issued 10 days before debit is processed.

Name of Account to be debited

Account Number

**B. Please debit my/our Access/Visa account number**

I/We authorise you until further notice in writing to charge to my/our account with you on or immediately after 15th day of each month unspecified amounts which may be debited thereto at the instance of British Telecommunications plc – TELECOM GOLD. Bills are issued 10 days before charge is applied to your account.

**C. Please invoice the company/authority.**

(✓) ☐ If you select this option, which is ONLY AVAILABLE to government establishments and public limited companies, you will be sent an authorisation form for completion which will require an official order number to accept unspecified amounts.

* *Telecom Gold is a trademark of British Telecommunications plc.*

# If you think the front looks good – you should see the back.

Once again Mushroom has answered a special need of all BBC computer users with their new WORKSTATION — no more untidy wiring, no more pulled plugs, transforms your system into a handsome console unit.

Features include:—

- ADVANCED CABLE MANAGEMENT
- TWIN 400K MITSUBISHI SLIM LINE DRIVES SWITCHABLE FROM 40 TO 80 TRACK WITH STATUS INDICATOR LED'S
- ON BOARD REGULATED 4 AMP POWER SUPPLY WITH OVERLOAD PROTECTION
- MAINS INPUT FILTER FOR CLEAN POWER SUPPLY
- FILTERED POWER TO THE 3 TAKE-OFF SOCKETS AT REAR FOR MICRO, MONITOR AND PRINTER

The WORKSTATION is manufactured to the highest safety specifications from lightweight aluminium attractively finished in oatmeal with orange trim. When not in use the computer is stored underneath, affording useful protection from accidental knocks or spillage.

The WORKSTATION, complete with twin disc drives, is suitable for all. Areas of use — Domestic, Schools, Local Authorities, Commercial and Industrial.

**This is a must for every user at only £399.00 Exc. VAT.**

Those people already owning disc drives can have them fitted into the WORKSTATION. Prices on request.

**Mushroom**
COMPUTERS LIMITED

Another Mushroom product from Broadway Electronics.
Patents pending.

Available direct from:
Broadway Electronics, 55 Tavistock Street, Bedford, MK40 2RF
Telephone: (0234) 58303. Telex: 826112 MUSCOM G, and selected computer dealers nationwide.

DUE TO REDUCTION IN ROM COSTS NEW LOW PRICES!

# SIMPLY LIGHT YEARS AHEAD THE BEST OF BRITISH ROM SOFTWARE FOR THE BBC AND SECOND PROCESSOR ADVANCED & POWERFUL BUT EASY TO USE

## ALTRA ENIGMA DISC IMAGER

Enigma Disc Imager is a 16K ROM which will give you 29 additional powerful disc commands. Some of which are: Enigma will IMAGE ANY DISC, Copy sectors, Repair bad tracks, Read deleted or special sectors, Dumps roms to disc, Loads roms from disc to sideways ram, Moves a programme up or down in memory, Unlocks locked tapes, Locks your tapes, Dumps cassette to disc, Global or selective renaming of directories, Writes deleted or special sectors to disc, Track and sector ID editor facilities, Selective file copier, Formats discs to be 40/80 track compatible (requires an 80 track drive with this command), Special disc editor to cope with protected discs, Special formatter to format discs with non standard tracks, Inserts new files into the catalogue, Enigma makes easy work of editing, copying, repairing, etc., of both standard and non standard discs.

## *ALTRA ENIGMA DISC IMAGER IS TUBE COMPATIBLE*

## ALTRA PROBE

Altra Probe is a 16K ROM which will give you 59 additional powerful machine commands. Some of which are: Altra Probe will list a basic programme straight from file, Formats basic assembler text output, Dissembles, Unpacks, Super Packs, Relocates, Edits memory, Switches off roms, Lists roms, Copies roms to specified address. Calculates free memory, Copies screen text to printer, Lists all specific types of basic variables and values, Graphics dump for Epson or NEC printers, Calculates and details free space on a disc, On board formatter which will automatically format a dual disc, Onboard formatter and verifier. Repairs bad tracks, Disc sector editor, Turns the tube on and off. These are only a few of the commands available from Altra Probe. Altra Probe makes easy work of editing, programme development, etc.

Altra Probe is available in two versions. PROBE1 and PROBE 2.

## *ALTRA PROBE 2 IS TUBE COMPATIBLE*

## ALTRA BASIC ED

Basic Ed, is on 8K ROM which contains 21 additional commands. They are: $ search, List matches, Number matches, Global replace, Selective replace, Bad programme relink, Copy lines from one part of a programme to another Format a listing, Move, Super pack, Renumber, Table line references, Unpack, Variables X ref, List entire programme, Keyboard immediate mode, Printer on/off, Paged mode on/off, List match lines, Concatenate, Strips rems, spaces etc. Altra Basic Ed, is an essential helpful tool for the Basic/Assembler programmer. Altra Basic Ed. is available in two versions. Basic Ed.1 and Basic Ed. 2.

## *ALTRA BASIC ED. 2 IS TUBE COMPATIBLE*

## ALTRA FIRST AID 1.1

First Aid 1.1 is an 8K ROM which contains 19 additional commands. They are: Machine code dissembler, Hex and ASCII dump. Sideways rom to ram copier, Function key predefined facilities, Variable table listing, Memory space free calculator, Checksum calculator, Rom lister, String search, Define function keys with strings, Rem and space Stripper, Bad programme fixer, Clear all variables, Clear ram from &0400 to &8000, Machine code monitor. Lists O.S. calls with their vectors, Lists the first 24 control codes. Altra First Aid 1.1 was designed to assist the Basic/Assembler programmer and the sideways rom user.

## ALTRA TUBE EDITOR

ALTRA TUBE EDITOR is a new and unrivalled full labelling Disassembler and editor Rom for the BBC and the second processor. Some utilities of ALTRA TUBE EDITOR are append labels to those in memory, Disassemble in 6502 and 65C02 mnemonics, End file overlay, Delete given label, Delete hex range, Delete markers, Dump memory, Edit memory, Overlay files, Find strings and bytes, Define a hex region, Define a label, List memory, Load labels, List labels, Set memory Calculate and print values, Print embedded text in a program after a call, Saves Roms, Saves labels. ALTRA TUBE EDITOR also supports many of the 6502 "ILLEGAL" OPCODES.

**ALTRA TUBE EDITOR FUNCTIONS IN THE BBC AS WELL AS IN 6502 SECOND PROCESSOR.**

ALTRA ROMS

Access

VISA

**209 North Street, Leeds LS7 2AA.**

☐ I enclose my order for the above products.

☐ *Please send me information sheet on* ______________ ☐ *S.A.E. enclosed*

Name ______________

Address ______________

______________

______________

**OFFICIAL ORDERS WELCOME**

**Telephone orders please ring: 0532 451508**
Send order to: **ALTRA ROMS, 209 North Street, Leeds LS7 2AA.**

*Please send me:*

| | | | |
|---|---|---|---|
| *ALTRA TUBE EDITOR* | ______ | *@ £39.00* | ______ |
| *E.D.I.* | ______ | *@ £39.00* | ______ |
| *PROBE1* | ______ | *@ £35.00* | ______ |
| *PROBE2* | ______ | *@ £39.00* | ______ |
| *F/AID1.1* | ______ | *@ £15.00* | ______ |
| *BASIC-ED* | ______ | *@ £25.00* | ______ |
| *BASIC-ED2* | ______ | *@ £29.00* | ______ |
| *I enclose the sum of* | | *TOTAL* | *£* ______ |

*Cheque, P.O. or Credit Card Number*

☐☐☐☐ ☐☐☐☐ ☐☐☐☐ ☐☐☐☐

**DEALER ENQUIRIES WELCOME** **ALL PRICES INCLUDE VAT & DELIVERY**

# Making a clean sweep of it – sideways

## CHRISTOPHER FEWSTER offers an alternative to the CLS and CLG commands

**SIDEWAYS offers an alternative to the conventional methods of clearing the screen, CLS and CLG. It is different because it clears the screen from left to right, an effect more pleasing to the eye than either CLS or CLG.**

Sideways will work in any graphics mode, that is, 0, 1, 2, 4, or 5, but does not operate across the Tube as it writes to screen memory directly.

This is how it works. The screen can be visualised as a number of vertical columns, one byte wide. There are 80 of these columns per line in 20k modes and 40 in 10k modes. Each individual column is cleared from top to bottom.

The program clears each column so fast that they appear to vanish instantaneously and this, combined with a short delay at the end of each column, gives the impression of a smooth sideways clear. The details are given in the notes on program structures.

To use the routine, call PROCassemble, set the computer into a graphics mode and then type CALL *clear*.

## PROGRAM STRUCTURE

| | |
|---|---|
| **50-100** | Draw a random pattern on screen and then clear sideways. |
| **150-160** | Define workspace used by the routine:<br>*M%,M%+1* hold address of the top of the current column.<br>*T%,T%+1* hold address of the next block to be cleared.<br>*L%,L%+1* hold the number of bytes per line (&280 for 20k modes, &140 for 10k modes).<br>*I%* holds the number of the current column.<br>*C%* holds the number of columns on the screen. (80 for 20k modes, 40 for 10k modes). |
| **210** | Checks to see if current screen mode is text only. Returns if this is the case. |
| **230-280** | Set initial values held in *M%,M%+1 L%,L%+1 I%* and *C%* for 20k modes and adjust if necessary for 10k modes. |
| **300** | Transfers value in *M%,M%+1* to *T%,T%+1*. |
| **310-380** | Work down column clearing it. |
| **330-350** | Clear a block of 8 bytes located at *T%,T%+1*. |
| **360-370** | Move down a line by adding the value of *L%,L%+1* to *T%* and *C%*. |
| **380** | Repeats until all 32 lines in the column are clear. |
| **390-400** | Set *M%,M%+1* to the start of the next column by adding 8 to its values. |
| **410** | Waits until start of next video scan to avoid flicker. |
| **420** | Repeats until all columns are cleared – until *?I%=?C%*. |
| **430** | Returns from routine. |

```
   10 REM ##### SIDEWAYS CLEAR #####
   20 REM  Christopher Fewster 1985
   30 REM  (c) The Micro User
   40 PROCassemble
   50 MODE2
   60 FORI%=1TO200
   70 GCOL0,RND(7)
   80 DRAW RND(1280),RND(1024)
   90 NEXT
  100 CALL clear
  110 END
  120 REM ###################
  130 DEFPROCassemble
  140 DIM CODE% 120
  150 M%=&70:T%=&72:L%=&74
  160 I%=&76:C%=&77
  170 FOR PASS=0 TO 3 STEP 3
  180 P%=CODE%
  190 [OPT PASS
  200 .clear
  210 LDA&361:BNE ok:RTS
  220 .ok
  230 LDA#0:STA M%:STA I%
  240 LDA#&30:STA M%+1
  250 LDA#&80:STA L%:LDA#2:STA L%+1
  260 LDA#&50:STA C%:LDA&356:BEQ L1
  270 CLC:LSR L%:LSR L%+1:LSR C%
  280 LDA M%+1:ADC#40:STA M%+1
  290 .L1
  300 LDA M%:STA T%:LDA M%+1:STA T%+
1
  310 LDX#0
  320 .L2
  330 LDY#7:LDA#0
  340 .L3
  350 STA(T%),Y:DEY:BPL L3
  360 CLC:LDA T%:ADC L%:STA T%
  370 LDA T%+1:ADC L%+1:STA T%+1
  380 INX:CPX#32:BCC L2
  390 CLC:LDA M%:ADC#8:STA M%
  400 LDA M%+1:ADC#0:STA M%+1
  410 LDA#19:JSR&FFF4
  420 LDX I%:INX:STX I%:CPX C%:BCC L
1
  430 RTS
  440 ]
  450 NEXT
  460 ENDPROC
```

*This listing is included in this month's cassette tape offer. See order form on Page 199.*

# New From CUMANA.......... Super Value Disk Drive Starter Pack

CUMANA'S
super value disk drive pack
CUMANA

If you're a BBC or Electron* user, you can now upgrade your micro with Cumana's Super Value Disk Drive Starter Pack.

For only £205.20 – or look for the special price at your local dealer – we'll supply you with a single disk drive, double density disk interface, diskettes, user manual and the right accessories for your micro. In fact, everything you need to increase the speed, efficiency and performance of your micro.

Send off your coupon or visit your local dealer today.

Trade enquiries welcome.

**CUMANA DISTRIBUTORS**

CEM Micro Computer Services (Belfast) 0232 24411, Telebank Commercial Services (Bolton) 0204 29411, Thompson Cook (Birmingham) 0527 25000, J.S. Simnett (Kingston-upon-Thames) 01-541 1495, Microworld (Edinburgh) 031-557-4196, Hugh Symonds (Bournemouth) 0202 26535, Eltec (Bradford) 0274 722512.

*Electron needs the plus one expansion unit.

**ORDER FORM (DISK DRIVE STARTER PACK OFFER)** ACORN USER NOVEMBER

To: CUMANA LIMITED, THE PINES TRADING ESTATE, BROAD STREET, GUILDFORD, SURREY GU3 3BH Tel: 0483 503121

Please rush me: .......... (Qty) Super Value Disk Drive Starter Pack(s) at £205.20 for BBC/Electron* *delete as appropriate

I enclose cheque/PO* for .................. or debit my access/visa* card no. .................. *Delete as applicable

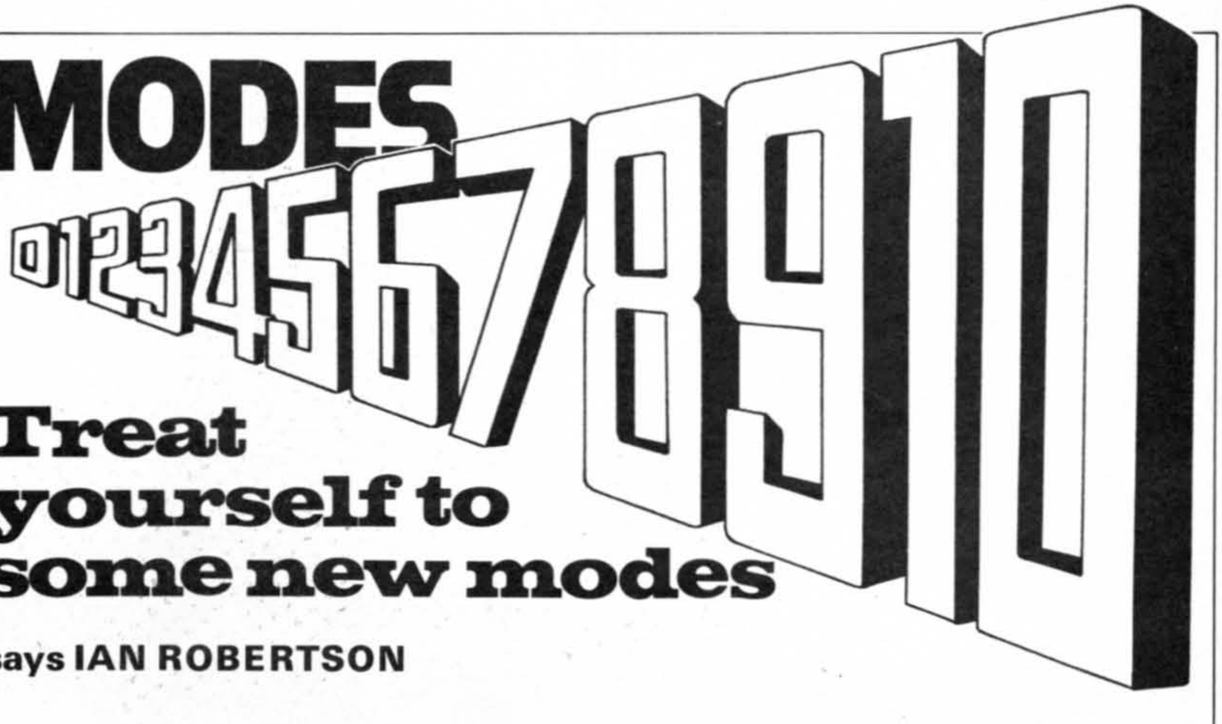
NAME ..................................................

ADDRESS ..................................................

..................................................

Tel: ..................................................

CUMANA®
The best name in memory



# Treat yourself to some new modes

### says IAN ROBERTSON

THE BBC Micro has eight different screen modes – 0 to 7. However, with the utility listed here you'll be able to use another three.

Two of them permit 16 colours and only require 8 or 10k of RAM. The other is an 8k, four colour mode.

For those of you who don't want to know how the program works have no fear, I'm not going to explain it. Suffice it to say that it fits in less than one page of memory (256 bytes) and is non-relocatable.

The new modes are called up with the *CODE command followed by a number between 8 and 10 – the three new modes. For example, to enter Mode 9 you would enter:

```
*CODE 9
```

If an invalid mode is selected an error will be produced. The three new modes are as follows:

| MODE | Dimensions | Colours | RAM size |
|---|---|---|---|
| 8 | 10*32 | 16 | 10k |
| 9 | 10*25 | 16 | 8k |
| 10 | 20*25 | 4 | 8k |

The value of HIMEM for the new modes must be set up correctly. So before you select the mode with *CODE you should enter one of the existing modes which uses the same amount of screen RAM.

Thus the two 8k modes are called from Mode 6 and the other from Mode 5.

Since these new modes are foreign to the operating system weird things happen when text windows are defined.

So long as you don't try anything too clever, though, you should find plenty of ways to amaze friends and impress your family with your three new modes.

```
   10 REM Modes 8,9 and 10
   20 REM By Ian Robertson
   30 REM (c) The Micro User
   40 CD%=&900
   50 ?&200=CD%MOD256
   60 ?&201=CD%DIV256
   70 FORT%=0TO2STEP2
   80 P%=CD%
   90 [:OPT T%
  100 PHP:PHA:TXA:PHA:TYA:PHA
  110 CMP#0:BEQ SKIP
  120 .error
  130 BRK
  140 OPT FNequb(255):OPT FNequs("Stu
pid! Please use *CODE <Value 8-10>")
  150 BRK:.SKIP
  160 CPX#8:BEQ mode8
  170 CPX#9:BEQ mode9
  180 CPX#10:BEQ mode10
  190 JMP error
  200 .mode8
  210 LDA#22:JSR&FFEE:LDA#5:JSR&FFEE
  220 LDA#154:LDX#224:JSR&FFF4
  230 .SKIP2
  240 LDA#15:STA&360:LDA#1:STA&361:LD
A#32:STA&34F:LDA#&55:STA&363:LDA#&AA:
STA&362:LDA#9:STA&30A
  250 JMP RESET
  260 .mode9
  270 LDA#22:JSR&FFEE:LDA#6:JSR&FFEE
  280 LDA#154:LDX#128:JSR&FFF4
  290 JMP SKIP2
  300 .mode10
  310 LDA#22:JSR&FFEE:LDA#6:JSR&FFEE
  320 LDA#154:LDX#132:JSR&FFF4
  330 LDA#3:STA&360:LDA#2:STA&361:LDA
#16:STA&34F:LDA#&55:STA&363:LDA#&AA:S
TA&362:LDA#19:STA&30A
  340 .RESET:LDA#20:JSR&FFEE:PLA:TAY:
PLA:TAX:PLA:PLP:RTS:]
  350 NEXT
  360 END
  370 DEFFNequs(string$)
  380 $P%=string$
  390 P%=P%+LEN(string$)
  400 =T%
  410 DEFFNequb(byte%)
  420 ?P%=byte%
  430 P%=P%+1
  440 =T%
```

# DYNAMIC DISCS

## TESTED BY BEEBUG

**BEEBUG, the largest independent computer user group in the UK, offer 100% tested discs supplied by one of Britain's leading disc manufacturers.**

## 10 FREE LIBRARY CASE

Orders for 10 discs are sent in hinged black plastic library cases.

## 25 FREE STORAGE BOX

Orders for 25 are delivered in strong plastic Storage box with 4 dividers.

## 50 FREE STORAGE BOX

Orders for 50 are delivered in strong plastic Storage box with 4 dividers.

## COMPARE PRICES

4 Types of Disc To Meet Your Exact Requirement

**48 TPI DOUBLE DENSITY**

| | | | | | |
|---|---|---|---|---|---|
| 10 | S/S D/D | £14.90 | 10 | D/S D/D | £20.50 |
| 25 | S/S D/D | £34.90 | 25 | D/S D/D | £46.20 |
| 50 | S/S D/D | £59.30 | 50 | D/S D/D | £82.40 |

**96 TPI DOUBLE DENSITY**

| | | | | | |
|---|---|---|---|---|---|
| 10 | S/S D/D | £20.50 | 10 | D/S D/D | £21.90 |
| 25 | S/S D/D | £46.20 | 25 | D/S D/D | £49.90 |
| 50 | S/S D/D | £82.40 | 50 | D/S D/D | £93.50 |

All prices include Storage Box, VAT and delivery to your door (UK)

Suitable for BBC Micro and all other computers using 5¼ inch discs including Atari and Commodore.

Fully Guaranteed – Not only by Beebug but by one of the UK's top disc manufacturers.

## ORDER FORM

**Official orders welcome**
**Access/Barclaycard**
**24 hrs line 0494 816666**
**Further information**
**on helpline 0727 60263**

Please supply me

@ £

@ £

@ £

Total cheque enc. £

Name

Address

To Beebugsoft, PO Box 109, High Wycombe, Bucks. HP10 8NP

BEEBUG SOFT

MORE FEATURES
MORE FUNCTIONS
MORE POWER
COMPANY'S FINANCIAL STATUS '85
Pear Tree Systems Limited
89
81
73
65
57
49
40
32
24
16
8
0
JAN FEB MAR APR MAY JUN JUL AUG SEP OCT NOV DEC
INCOME
X 000
EXPENDITURE
KBL
BOXER 12
KBL 128 PC

# Buy the Software and the computer comes FREE!

The KBL 128 PC is a remarkable new small business system with a powerful 128K RAM.

Complete with Infra-Red Remote Keyboard, Hi-Res Monochrome Monitor, twin 1.4 MByte Data Storage Disk Drives, a choice of English/French/Greek/Arabic operating systems, PLUS a staggering range of Business Software Programs worth £1170 – the complete package costs only £1170 ex VAT.

The KBL 128 PC is fully compatible with all Acornsoft, giving access to thousands of additional programs.

**THE HARDWARE**

- * 128K RAM COMPUTER
- * ACORN ADFS FITTED STANDARD
- * INFA-RED REMOTE KEYBOARD
- * 1.4 MByte DISK DRIVES
- * 80mm COOLING FAN FITTED
- * HI-RES MONOCHROME MONITOR (COLOUR OPTION AVAILABLE)

## PEAR TREE SYSTEMS LTD

PEAR TREE MEADOW
ELLINGTON THORPE
HUNTINGDON
CAMBS PE18 0AW
TELEPHONE 0480 811573

**THE SOFTWARE**

- ● WORD PROCESSOR
- ● STOCK CONTROL
- ● CUSTOMER DATA BASE
- ● PURCHASE LEDGER
- ● SALES LEDGER
- ● NOMINAL LEDGER
- ● INVOICING/CREDIT NOTES
- ● PROFORMA QUOTATIONS
- ● BANK A/C CONTROL
- ● PETTY CASH CONTROL

TO PEAR TREE SYSTEMS
ELLINGTON THORPE
HUNTINGDON CAMBS PE18 0AW

PLEASE RUSH ME DETAILS OF
YOUR AMAZING LAUNCH OFFER

NAME

ADDRESS

TELEPHONE

# *It's on its way... the BIGGEST show of all!*

- ★ **Your first chance to see the exciting programs and peripherals now being planned for 1986.**
- ★ **Hundreds of Christmas hardware and software bargains from leading BBC Micro and Electron suppliers.**
- ★ **Free software – bring your own blank cassette and download programs directly from Micronet.**
- ★ **Use our satellite link to a giant American database and send messages to micro users in the USA.**
- ★ **Meet the experts – programmers and writers will be on hand to answer all your queries.**

ELECTRON & BBC MICRO USER SHOW

***By handing in this voucher at the door you save £1 off the normal admission price of £3 (adults) and £2 (children).***

*(Valid for a maximum of 4 people)*

10am-6pm, Thursday, November 14
10am-6pm, Friday, November 15
10am-6pm, Saturday, November 16
10am-4pm, Sunday, November 17

**New Horticultural Hall**
**Westminster, London SW1**

*Number attending:* ☐1 ☐2 ☐3 ☐4

**This voucher is worth £1 per head!**

*There are also specially reduced prices for school and college groups. Parties of 10 or more will be admitted for £1 per head if bookings are made in advance. Send SAE and cheque (made payable to Database Publications) to:*

***Electron & BBC Micro User Show,***
***68 Chester Road, Hazel Grove,***
***Stockport SK7 5NY.***
***Tel: 061-480 7863***

ELECTRON &
BBC MICRO
USER SHOW

*Thursday to Sunday, November 14 to 17*

*New Horticultural Hall, Westminster, London SW1*

SPACE WAS THE FINAL FRONTIER
AKHTER
Gold
Standard
2 Year Warranty
MD200A
MD400A
MD402C
MD802C
MD402D
MD802D

AKHTER
AKHTER COMPUTER GROUP
AKHTER HOUSE PERRY ROAD
STAPLE TYE HARLOW ESSEX CM18 7PN
0279-443521 (10 lines)
Telex 818894 AKHTER G.

Opening Hours: Mon-Fri 9am-6.30pm
Sat 10am-5pm
CALLERS WELCOME AMPLE PARKING
DELIVERY:
Express Delivery £8.00 + VAT per parcel
2-3 Day Delivery £5.00 + VAT per parcel
Small Parcels:
Postal Service £1.50 per parcel
Prices apply to UK Mainland only

VISA

AKHTER

*For the complete range of:*

# DISK DRIVES

## 100% BBC Compatible High Quality, Half-Height Disk Drives

**All these drives are supplied ready cased and equipped with all necessary cables, formatting disc and User Guide.**

### *5¼" DUAL DRIVES, HORIZONTALLY MOUNTED (Monitor Stand Metal Case, with PSU)*

| **MD802D** | **MD402D** |
|---|---|
| Double-sided 800k (2 x 400k)<br>40/80 track switchable | Double-sided 400k (2 x 200k) track |
| **£260 +VAT £299** | **£234 +VAT £269** |

### *5¼" DUAL DRIVES, VERTICALLY STACKED (Housed in Metal Case, with PSU)*

| **MD802E** | **MD402E** |
|---|---|
| Double-sided 800k (2 x 400k)<br>40/80 track switchable | Double-sided 400k (2 x 200k)<br>40 track |
| **£234 +VAT £269** | **£216 +VAT £249** |

### *5¼" DUAL DRIVES, VERTICALLY STACKED (Housed in Plastic Case)*

| **MD802C** | **MD402C** |
|---|---|
| Double-sided 800k (2 x 400k)<br>40/80 track switchable | Double-sided 400k (2 x 200k)<br>40 track |
| **£186 +VAT £214** | **£169 +VAT £195** |

### *5¼" SINGLE DRIVE (Housed in Metal Case, with PSU)*

| **MD400B** | **MD200B** |
|---|---|
| Double-sided 400k<br>40/80 track switchable | Single-sided 200k<br>40 track |
| **£120 +VAT £138** | **£112 +VAT £129** |

### *5¼" SINGLE DRIVE (Housed in Plastic Case)*

| **MD400A** | **MD200A** | **MD100A** |
|---|---|---|
| Double-sided 400k<br>40/80 track switchable | Double-sided 200k<br>40 track | Single-sided 100k<br>40 track |
| **£99 +VAT £114** | **£95 +VAT £109** | **£79 +VAT £91** |

### *5¼" NEW LOW COST DRIVE WITH 1 YEAR WARRANTY (Housed in Metal Case)*

| **SD400A** | **SD400B** | **SD802E** |
|---|---|---|
| Double-sided 400k<br>40/80 track switchable<br>without PSU | Double-sided 400k<br>40/80 track switchable<br>with PSU | Double-sided 800k<br>(2 x 400k)<br>40/80 track switchable<br>Vertically stacked<br>dual drives |
| **£86 +VAT £99** | **£104 +VAT £119** | **£191 +VAT £219** |

### *3½" VERTICALLY STACKED DRIVES AT LOW, LOW COST WITH 1 YEAR WARRANTY*

| **MD400F** | **MD802F** |
|---|---|
| Double-sided 400k<br>(single-density)<br>800k (double-density),<br>80 track switchable.<br>Single drive, with provision for second drive to be added to the same case. | Double-drive 800K<br>(single density)<br>1600K (double density)<br>80 track<br>Dual drives ready fitted in the vertically stacked casing. |
| **£99 +VAT £114** | **£173 +VAT £199** |
| **MD 400G** | **MD 802G** |
| As 400F with power supply | As 802F with power suppy |
| **£121 +VAT £139 inc.** | **£199 +VAT £299 inc.** |

### 3M DISKETTES

744 SS DD 40T (Box of 10) £15.60 + VAT £17.95
745 DS DD 40T (Box of 10) £22.57 + VAT £25.95
747 DS DD 80T (Box of 10) £26.04 + VAT £29.95

**DEALER ENQUIRIES WELCOME**
**SPECIAL EDUCATION DISCOUNTS AVAILABLE**

**N.B. All prices are subject to change without nôtice and are rounded up to the nearest pound.**

AKHTER INSTRUMENTS LTD T/A

AKHTER COMPUTER GROUP

AKHTER HOUSE, PERRY ROAD, STAPLE TYE,
HARLOW, ESSEX. CM18 7PN U.K.

*For affordable computer solutions*

---

# 16k EPROM Advanced Disc Toolkit

containing over 30 commands

*It has just about every utility you're likely to need (Electron User)*

It's excellent value for money *(Acorn User)*

*"This Rom is an absolute winner!" Viewfax Tubelink on PRESTEL*

*Take a close look at 'ADT' it's superb Electron User*

including
format ● verify
free disc space ● disc editor
menu ● memory editor ● file transfer
memory disc basic program search ● file copy
read write sectors ● load & move file in memory
envelope & function key definitions ● move memory block
compare files/discs ● list file & directory names (ADFS utility)
'unplug' roms ● catalogue roms ● display current filing systems

**INVALUABLE TO EVEN NON- DISC USERS**

Advanced Disc Toolkit is a 16k utility ROM designed for both BBC and Acorn Electron computers, and 65C02, Z80 second processors, single and double density disc filing systems, including Acorns new advanced disc filing system, ADFS, Acorn Winchester drive, Econet and sideways RAM. ADT contains over 30 useful utilities to enhance your computer system.

**DISC Commands:**
Disc sector editor in 40/80 column modes. Disc search for strings/bytes. Recover/restore sectors from any part of a disc. Format/verify any number of discs in one command. Compare discs. Backup discs using 2nd processor memory. Display free space map, free/used files. Electron ADFS disc utilities, format/verify/backup/build/list/type. Dual catalogue.

(ADT will operate with any DFS which is fully compatible with the Acorn DFS)

**MEMORY commands:**
EXAMINE/MODIFY/PRINT memory in any mode in IO/Second Processor memory/Roms/Rams as 65C02 bi-directional disassembler/hex/ascii in variable line sizes, in a predefined window.
Search IO/Second Processor/Roms/Rams for strings or bytes. Search for variable names in BASIC/HIBASIC. Move memory between IO/Second Processor/Roms/Rams.

Due to the success of ADT, we are able to maintain the price of £29+p&p (£30+VAT)

Quite simply . . . . the ultimate Toolkit

**OTHER commands:**
Transfer files between filing systems, eg TAPE, DISC, ADFS, NET. Display catalogue of all Roms. Turn off sideways Roms. List envelope/key definitions. Load/Run programs from DISC/NET/below page (& E00). Run any file type from DISC/NET/ADFS from a menu in 40/80 column modes. Change a files load/execution address. Compare files. Display files in all directories. Display all directory names. Backup files in same directory. Dump files in 65C02 disassembler/hex/ascii in variable line sizes.

### OTHER PRODUCTS

NEW SUPPLIES OF 27128 EPROMS £5 OR:
ONLY £4 FOR QTY 4+ . . (inc. p&p) +VAT

### ELECTRON PRODUCTS

**Advanced Sideways Ram**
A unique facility for the ELK! Software/EPROMS can be loaded in and automatically write protected. No links to pull or connect. Can be switched between 2 x 8k or 1 x 16k. FREE software support to include print buffer.
**£33 +p&p & VAT**

**Advanced Rom Adaptor I**
Now you can gain access to many existing EPROMS by simply inserting them into this budget adaptor cartridge that plugs into the Plus1.
**£8 +p&p & VAT**

**Advanced Rom Adaptor II**
As the ARA 1 but with 2 sockets, it is now possible to have 4 EPROMS' on line without attaching bulky interfaces. A key feature of this product is the built in facility to upgrade to 8k or 16k RAM.
**£12 +p&p & VAT**

**Advanced Electron DFS**
This EPROM allows ELK and Plus 3 users to use both ACORN DFS'S; ADFS & 1770 DFS (as supplied in the BBC B+). Now you can load, chain etc. compatible BBC disc-based software.
**£20 +p&p & VAT**

ORDER NOW

**Advanced Computer Products**
6 Ava House,
High Street
Chobham, Surrey.
GU24 8LZ

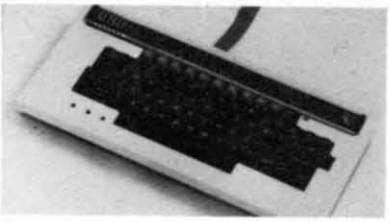
Telephone: (0276) 76545

### ORDER FORM

Please send me . . . .
____ A.D.T. @ **34.50** = ____
____ A.R.A. I @ **10.35** = ____
____ A.R.A. II @ **14.95** = ____
____ A.S.R. @ **39.10** = ____
____ A.E.D. @ **24.15** = ____
____ DFS Manual @ **4.75** = ____
*✶ Special Offers ✶*
____ A.D.T. +ARA I @ **42.50** = ____
____ A.E.D. +ARA I @ **32.50** = ____
____ 16k EPROMS @ **5.75** = ____
____ 16k EPROMS 4+ @ **4.60** = ____
I enclose payment for £ ____
My Name ________
Address ________

REF FM

**Electron & Tube are trade marks of Acorn Computers Ltd.**



## The Microtest BCASE

Are you fed up with your computer looking more like a junior construction set than a piece of High Tech equipment? Is your computer case made of flimsy plastic? Does it sag when you put a book on it?

Now is the time to do something about it!!!

The new compact MICROTEST BCASE has taken over 18 months to develop by our R & D section. We feel (probably with some bias) that there is nothing currently on the market to compare to it!

The CPU housing is made from plated steel with an external acrylic bonded vinyl coating. So it's light, tough but good looking and just as important easily cleaned. It houses your BBC computer board (all issues of B and B+) and power supply, as well as single or twin 'half-height' disc drives if required. It maintains the use of standard BBC Computer connectors, and can if required be fitted with a 3" fan for additional cooling.

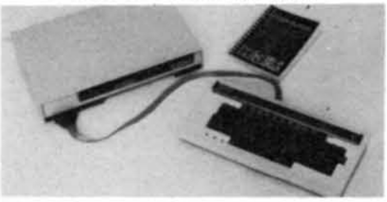
The BCK detached Low Profile Keyboard case is also made of steel and houses the existing BBC Computer keyboard. Inc. 600mm. cable.

The BCNK detached Low Profile Keyboard has a separate numeric pad for those of you that need fast and efficient numeric input. Inc. 600mm. cable and numeric pad. (A basic knowledge of soldering is required to fit the numeric keyboard and standard to this case option).

| | |
|---|---|
| **CPU Main board housing** | **£53.00** |
| **BCK Keyboard case** | **£32.00** |
| **BCNK Keyboard case** | **£44.00** |
| **3" Fan (Super Low Noise)** | **£20.00** |
| **80 Watt Switched Mode PSU inc switch, cable loom, etc** | **£99.95** |

Carriage £4.00 for keyboards, £4.00 for CPU case or £6.00 for keyboard & CPU case. Units are priced individually so that users could run a detached keyboard from an existing BBC computer, please state when ordering. We will install your components into our case for £20.00 (including carriage, packing and insurance back to you). PLEASE PHONE US FOR A RETURNS NUMBER BEFORE DESPATCHING ANY ITEMS OF EQUIPMENT TO US FOR FITTING.

Please send SAE for spec. sheet



## DisCat

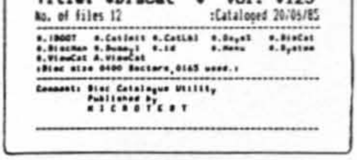
DisCat creates disc labels and catalogues the files on all your discs, creating a wealth of information which can be accessed by DisCat's own built in database whenever you need to find a file or reference.

DisCat is easy to use and makes printing labels for your discs the simplest of tasks. Create labels for your whole collection of discs or just for one.

Additional information shows you the size of the disc (40 or 80 track, single or double density) and the amount of space used. Each disc is tagged with a volume number for easy identification. There is room for a comment on the label plus the data catalogued and the number of files present on the disc.

As each disc is catalogued you are given the opportunity not only to add comments to the disc label but to also make comments beside each file held on the disc. DisCat's built in database provides full database facilities allowing the resulting information to be searched for any filename or reference.

DisCat uses standard sized labels and comes with 50 labels to get you going. Plus a comprehensive manual.



```
Title: *DisCat  *  Vol: v123
No. of files 12         :Cataloged 20/05/85
-----------------------------------------------
:Disc size 0400 Sectors,0163 used.:
-----------------------------------------------
Comment: Disc Catalogue Utility
         Published by
         M I C R O T E S T
-----------------------------------------------
```

Compatible with BBC B & B+ but must be an Acorn DFS

### DISCAT – £14.95
### Please add £1.00 P&P

## Microtest List Manager

### A Data Filing System for the BBC Microcomputer

A disc-based database for the BBC model B on disc that is both sophisticated yet easy to use. LIST MANAGER has been specifically designed to introduce the newcomer to the concept of databases with friendly menus, command prompts, data entry and editing routines. With the aid of comprehensive and comprehensible documentation, the user is encouraged to make the most of the BBC's disc storage system and LIST MANAGER's data handling powers.

LIST MANAGER is available from MICROTEST on disc with full manual at **£14.95** inc postage and packing. Please state 40 or 80 track when ordering.

## Microtest DairyFile

If you have a BBC Micro and keep a dairy herd we are sure that you would like to run **DairyFile.**

DairyFile will let you save time and money by simplifying the record keeping and calculations relating to the dairy herd. Yield, feed, finance, breeding and illness details can be converted into graphs and print-outs for each cow, each monthly group, or the whole herd.

All old data is preserved – comparisons with previous years are easily made, for up to 200 lactating cows.

**Please state 40 or 80 track and printer details when ordering DairyFile. (No printer needed for demo disc).**

| | |
|---|---|
| **DairyFile** | **£69.00 inc VAT plus £1.00 p&p** |
| **Demo Disc + Printouts** | **£3.00 inc VAT plus £1.00 p&p (deductable from purchase price)** |

## Disc Menu ROM

Designed to save time and alleviate problems for the overworked user who needs to run programs from disc in a hurry. No need to worry about 31 files on a disc and trying to find the file required, hidden amongst other data files with similar names.

By simply pressing a number key in the range 0-3 and the BREAK KEY, the computer will 'auto menu' the drive number selected. Something that used to take a couple of minutes can now be done in as little as five seconds.

Also included in the ROM are many useful utilities, including:

*CONCEAL*
*CLOSE*
*FREE*
*REVIVE*
*REVEAL*
*REPAIR*
*EX*
*MAP*
*DEAD*
*MENU*
*KILL*
*LEX*
*VERIFY*
*HIDE*
*ROMS*
*FORM*
*LCAT*
*EXCLUDE*

Also included is REPAIR, an intelligent verify utility. So even if your disc does crash 'Menu ROM' can now try to repair it losing only a minumum of data.

A total of 17 EXTRA commands, at the very affordable price of **£12.95** INC VAT. **P&P £1.00.**

*TUBE is a registered trade mark of ACORN COMPUTERS LTD. Screen shot is 'ELITE' by kind permission of ACORNSOFT LTD.*

## MICROTEST LIMITED

**18 Normandy Way, Bodmin,**
**Cornwall PL31 1EX**
**Tel: 0208 3812. Bulletin board**
**(Prestel compatible) 0208 77677.**
***Dealer and Export Enquiries Welcome***

## *It's here, the New Issue 2+*
## *Starstick ROM*
## *& Quickshot Joystick*

*Picture shows Starstick ROM, Patchlead and Quickshot Joystick (along with Acornsoft's Elite Package – by kind permission of Acornsoft)*

This new release of the very popular Starstick & Quickshot programmable joystick offers new possibilities. Over 30 extra commands which include: *Elite, *Replica, *Sneaky, *Plonk, *Adval, *Prop, *Kill, *Revive, *Reset, *Repeat, *Map, *Ksave, *Kload, *Cursor and *Stick.

Fully help driven format with 20 page manual including full fitting instructions.

Not only is the package fully programmable, but it's response time is also user variable. Thus giving YOU the ability to tailor the joystick to YOUR requirements, as only YOU can.

The new issue software is fully compatible with Disc versions of Acornsoft's 'Elite', Acornsoft's 'Aviator' and Clares 'Replica'. It features relocatable workspace to enable it to work with many of the few games it would not work with before. As in the previous issue, the Starstick ROM is fully 'TUBE' compatible.

Specifically designed with the Disc user in mind, the software is not affected by any combination of the BREAK, SHIFT, or CONTROL keys.

The self centring, rapid action Joystick plugs into the user port and is managed by the Starstick ROM. The ROM monitors O.S. calls and patches the joystick into games programs. The Starstick functions with most games and even those that are not designed to function with joysticks. IT IS VERY IMPORTANT HOWEVER THAT THE GAMES USE LEGAL OPERATING SYSTEM CALLS AS MOST DO.

The New prices are:

| | |
|---|---|
| **Starstick ROM (version 2+) and Quickshot II** | **£29.50** |
| **Starstick ROM (version 2+) and Patch lead** | **£25.30** |
| **Starstick ROM (version 2+)** | **£19.55** |
| **Starstick ROM Reprogramming Charge** | **£5.50** |

*PLEASE INCLUDE £1.00 for CARRIAGE and packing.*

The Patch lead option allows you to plug any ATARI/SPECTRUM Style joystick into the BBC computer with the STARSTICK ROM.

Also included in the package is a powerful ROM Manager to enable you to 'KILL' (temporarily) any ROMs that might cause you problems.

All commands in MICROTEST ROMs can be prefixed by 'M' should any other ROM try to intercept the same command name.

# Calculating comparisons

## KATHERINE CRANFORD reviews the latest spreadsheet for the BBC Micro

**IF the word spreadsheet turns you off, or the idea of playing with columns of figures doesn't immediately grab you, think again – these things have been known to become thoroughly addictive.**

They can also be invaluable, and for many purposes, paper and pencil are no substitute.

While yesterday's prototypes were rather crude and user-hostile, today's spreadsheet is a whole new ball game. Inter-Sheet, from Computer Concepts, is one such package.

All spreadsheets follow the same general principles. Your screen becomes a "window" on to a very large "sheet" of many rows and columns of "boxes" into which you can put numbers, formulae or text.

You can make the contents of the boxes as simple as the equivalent of "put the result of adding together these two boxes into this third box", or lengthy mathematical statements containing functions such as sine, logarithms, pi and so on.

Inter-Sheet comes on two ROMs, the first containing the spreadsheet, the second containing link facilities – more about these in a minute.

Included also are introductory and reference manuals, a quick reference card, chip-fitting instructions and a function key strip.

The package operates via a main menu from which you can access external options such as spooling or printer commands. The Escape key switches you between worksheet and menu modes.

Worksheet formatting, such as box editing, justification, insertion or deletion of rows and columns and so on are all done using the function keys.

Other options are carried out using a slash command, such as /C for Copy. And all BBC star commands are accessible from the main menu.

One of the crucial aspects of a spreadsheet is the extent of its replication facility. This is one of Inter-Sheet's fortes, particularly the facility to copy in two dimensions. This is the ability to copy the contents – formulae, numbers or text – of a block of boxes to another block in the worksheet.

The program automatically assumes relative references are required, which means box references are appropriately adjusted rather than retaining a static reference to the original box.

This, depending on what you're doing, can be a real bonus. But if it ain't what you want you have to spell the instruction out in each formula.

Still, you can't have your cake and eat it, I suppose.

As for speed, if that's what you're interested in, Inter is probably the fastest spreadsheet for the BBC Micro, and in fact as fast as anything available for bigger machines. But, there again, the slowest of the three packages tested for comparison purposes has a few nice extras not implemented on Inter – see Figures I to III.

Among the features Inter provides are all the usual mathematical functions, PI, LN, LOG, RAD, SQR, and so on. Similarly you'll find the standard SUM, IF, MAXIMUM, MINIMUM, plus

→

| | Inter-Sheet | Ultracalc 2 | Viewsheet |
|---|---|---|---|
| Price | £56.35 | £79.50 | £59.80 |
| Published by | Computer Concepts | BBC Publications | Acornsoft |
| Worksheet size | 256 × 64 | 256 × 63 | 256 × 256 |
| Usable with 2nd processor | No (Yes, if disc-based) | Yes | Yes |
| Notable features | Excellent communications facilities.<br>2-dimensional replication.<br>Very fast replication and re-calculation.<br>Multiple sheets in memory possible.<br>Linked program Inter-Graph available for producing graphs from worksheet data. | 2-dimensional replication.<br>Price (it's more!).<br>Label values and wildcards.<br>Command macros,<br>Additional functions e.g. NPV, HTN(x), and LOOKUP repeat.<br>Additional formatting commands, including inter-column gap, and individual box colouring, e.g. all minus figures can be red | Size.<br>Primitive bar charts and windows possible.<br>Serious limitation: replication can only be done by row or by column. |

*Figure I: Major features and notable differences between Inter-Sheet and its ROM based rivals*

| | Inter-Sheet | Ultracalc 2 | Viewsheet |
|---|---|---|---|
| Comms./links | Yes* | Yes | Yes |
| 2-dimensional replication | Yes* | Yes* | No |
| Multiple sheets in memory | Yes* | No | No |
| All standard editing/formatting facilities | Yes | Yes | Yes |
| Extra editing/ formatting features | No | Yes* | No |
| All standard (maths etc.) functions | Yes | Yes | Yes |
| Extra functions, (e.g. NPV) | No | Yes* | No |
| "Windowing"/fixing parts of the screen | Yes | Yes | Yes |
| Protection of boxes | Yes | Yes | Yes |
| System star commands | Yes | Yes | Yes |
| Documentation | Overall good | Pompous, but has excellent worked examples | Comprehensive |

*Figure II: At-a-glance table of features. An asterisk indicates a particularly good implementation of the facility*

## *From Page 131*

LOOKUP, which returns 1 or 0 depending on whether a value is found in a range.

The package has not been specifically configured for financial applications, however. There are no functions which take care of percentage calculations, net present value (NPV), and the like.

And while it is relatively straightforward to concoct your own formulae for these, I suspect that most users would rather have them ready made. There is also no MOVE command, so this has to be done the long-winded way, copying, then deleting the old boxes.

Other options include the facility to change the worksheet colours – back and foreground, but not that of individual boxes – and to swap between three different modes, 40, 80 or 105 columns, from within the worksheet. The amount of memory available for your worksheet does drop dramatically in 105 column mode.

Printer codes can be set up from a submenu, with no need to resort to *FX commands. And the whole, or just parts, of the worksheet can be printed out either as data or as formulae.

Parameters such as the mode you are currently using, column widths, cursor position and so on are saved along with the worksheet. A LOCK command allows rows, columns or individual boxes to be protected against accidental erasure or alteration.

There is no windowing facility as such, but the Hold option makes a very acceptable alternative, allowing the user to fix a part or parts of the screen in a very straightforward way. A minor but useful addition would have been a top-of-page header/titles facility.

Boxes containing text and those containing numeric data can be freely mixed, and text boxes are allowed to come within the scope of formulae without interfering with the end results.

Likewise, if boxes or rows are deleted, where a formula elsewhere in the spreadsheet has a reference to the deleted boxes, this does not upset the beast as long as the deleted boxes are above, not below, the formulae.

But where Inter scores supremely is on the communications side. With the basic ROM you can Export and Import or spool data, either as formulae or results, all from the main menu. (You would use Export rather than spooling to an Ascii file where you intended the file to be used by another ROM Link package.)

This makes for immensely easy data transfer between packages or machines – essential for the serious user – without being plagued by such things as the niceties of floating point number reversed bytes. Conversely, so long as you follow a few simple rules, using a worksheet prepared under another package becomes possible.

The other ROM that comes with the package provides a number of additional facilities, but principally the ability to have up to 16 worksheets in memory at any one time and to talk directly to other ROM Link packages.

While keeping track of 16 worksheets simultaneously may not be your idea of fun, these facilities clearly can be a very useful shortcut for swapping chunks of figures around between, say, just two or three worksheets.

Both ROMs are therefore required to use the package to the full, and you really need either a sideways RAM or ROM board if you don't want to keep your keyboard permanently unscrewed and sponge and chip tweezers constantly on hand.

But if you can only make room for the basic spreadsheet ROM this is more than adequate for most purposes.

The package is not designed for use with a second 6502 processor, but a disc version is available – for an extra £5 –

| | Inter-Sheet | Ultracalc 2 | Viewsheet |
|---|---|---|---|
| Speed<br>(i) Re-calculation (inc. screen refresh): | 1.4 | 3.5 | 2.4 |
| (ii) 2-dimensional replication: | 5.9 | 80.1 | N/A (Can only be done by row or column) |

*Carried out on a 24 x 24 matrix containing formulae for creating "times tables". Speeds were constant whether the table was a 1, 13 or 240 times table. 40 col/Mode 7. Time in seconds.*

*Figure III: Benchmarks*

relocated on the 6502 which allows up to 42k storage, although the ROM must still be present and it excludes use of the ROM Link.

The documentation is slim, but nice. The introductory booklet in particular is readable and clear, with plenty of gentle advice for the novice spreadsheet user.

One big criticism however is that there are no worked examples. It is also just slightly less than comprehensive, for instance with regard to the error messages section, but then I've never yet come across any documentation that covered every eventuality.

A real breakthrough would be a spreadsheet for the BBC Micro that allowed you to perform database-type functions on your worksheet such as SELECTing. The next best thing would be a complementary companion program for doing this. With Inter-Sheet the foundations for it seem to have been laid. One companion package already available is Inter-Graph, intended to produce charts and graphs from Inter-Sheet data. And when Inter-Base, the database, sees the light of day the suite will really come into its own.

As it stands it's a solid, friendly spreadsheet, incorporating a sophisticated link/communications facility at a goodish price, £56.35

Microdis

MAIL ORDER ONLY

Dept MU1085, 46 MIDDLE STREET, BLACKHALL,
HARTLEPOOL, CLEVELAND TS27 4EA
Tel: 0783 872430

Sorry, office only – No callers without appointment

NOTE: ALL PRICES INCLUDE VAT AND CARRIAGE

| (Free cable and paper) | Ex VAT | Inc VAT & Carriage |
|---|---|---|
| **DOT MATRIX PRINTERS** | | |
| Canon PW1080A (nlq) | 239.50 | 279.95 |
| Canon PW1156 | 334.95 | 389.95 |
| Epson RX80 (100 cps) | 189.00 | 217.95 |
| Epson LX80 (new) 100cps Normal, 22cps NLQ. Friction | 196.77 | 229.74 |
| Epson LX80 Tractor Attachment | 20.00 | 25.50 |
| Epson LX80 Sheet Feeder | 49.95 | 61.53 |
| Epson FX80 (160cps) | 315.00 | 366.95 |
| Epson LQ1500 (200cps, professional) | 943.00 | 1098.00 |
| Epson P40 (Thermal, 80 col) | 71.95 | 86.95 |
| Star SG10 120 cps/nlq | 224.95 | 259.95 |
| Star SG15 15½" carriage | 309.95 | 359.95 |
| **DAISYWHEEL PRINTERS** | | |
| Quen Data/Daisystep 2000 | 194.95 | 229.95 |
| Juki 6100 | 289.95 | 339.25 |
| **COLOUR PRINTERS** | | |
| Seikosha GP700A (Special offer – few only) | 230.00 | 269.88 |

FREE!
WITH EVERY PRINTER
– LISTING PAPER + BBC LEAD
(£6 extra for Amstrad lead – phone for other leads)

| | | |
|---|---|---|
| **LISTING PAPER** | | |
| 60 GSM (listing) 9.5" x 11" 2000 sheets | 10.50 | 17.25 |
| 80 GSM (letter grade) 9.25" x 12" 2000 sheets | 13.40 | 20.58 |
| Labels – Box of 8000 (2 abreast on 9.5" backing with central perf.) | 34.51 | 44.86 |
| **HIGH QUALITY DISC DRIVES BY OPUS with free 2 year warranty** | | |
| **BBC SX (Uses BBC's Power Supply)** | | |
| SX100L 40 track single side Low cost | 59.95 | 79.95 |
| SX100 40 track single side (100K) | 74.95 | 89.95 |
| SX200D 40 track double side (200K) | 97.95 | 116.95 |
| SX400S 80 track double side (400K) 40/80 | 104.95 | 124.95 |
| **Dual Ex PSU** | | |
| DX200 Dual 40 track single side | 139.95 | 165.95 |
| DX400 Dual 40 track double side | 194.70 | 228.95 |
| DX800S Dual 80 track double side 40/80 | 214.50 | 251.95 |
| **With Built In Power Supply** | | |
| S100 40 track single side (100K) | 94.95 | 113.95 |
| S200D 40 track double side (200K) | 115.95 | 137.95 |
| S400S 80 track double side (400K) 40/80 | 131.95 | 155.95 |

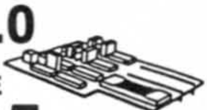
| | Ex VAT | Inc VAT & Carriage |
|---|---|---|
| **Dual Drives (with Power Supply)** | | |
| D200 2 x 40 track single side (200K) | 183.95 | 215.95 |
| D400S 2 x 80 track single side (400K) 40/80 | 218.95 | 256.50 |
| D400D 2 x 40 track double side (400K) | 218.95 | 256.50 |
| D800S 2 x 80 track double side (800K) 40/80 | 239.95 | 279.95 |

NOTE – All 80 track drives have a 40/80 switch!

| | | |
|---|---|---|
| **MEDIA – ARCHIVE DATA – EX DYSAN FACTORY! (Fully guaranteed)** | | |
| High quality diskettes 5.25" boxed in 10's with plastic library case | | |
| 40 Track SSSD | 12.50 | 15.50 |
| 40 Track DSDD | 12.50 | 15.50 |
| 80 Track SSSD | 13.50 | 16.50 |
| 80 Track DSDD | 13.50 | 16.50 |
| **HEAD CLEANING KITS** | | |
| 3M Standard | 12.50 | 15.95 |
| Rexel Drive/KBD/VDU Cleaning Kit | 19.11 | 22.95 |
| **MONITORS – Green** | | |
| Sanyo 12N | 69.00 | 83.95 |
| Sanyo 12H (hi res) | 89.50 | 107.70 |
| **Colour 14" Screen** | | |
| JVC High Resolution | 169.95 | 199.95 |
| **MICROVITEC RGB MONITORS (BBC)** | | |
| 1431 (472 x 585 dots) | 169.95 | 199.95 |
| 1431 APMS4 (with audio & PAL) | 195.50 | 229.95 |
| 1451 (653 x 582 dots) | 225.95 | 264.45 |
| 1451 APMS4 | 294.95 | 343.95 |
| **OTHER BBC PERIPHERALS** | | |
| DFS Acorn Disk Interface | 85.00 | 99.59 |
| QFS double density disk interface | 60.82 | 69.95 |
| Penman plotter/turtle/mouse | 213.35 | 249.95 |
| Acorn Data Recorder | 27.95 | 36.74 |
| Sanyo DR101 | 28.95 | 37.89 |
| Sanyo DR202 | 36.95 | 47.09 |
| Teletext Receiver | 184.95 | 217.29 |
| Speech Interface Kit | 46.90 | 58.54 |
| 6502 Second Processor | 173.50 | 204.13 |
| Z80A Second Processor | 308.95 | 359.89 |
| ATPL ROM Board | 37.95 | 44.95 |
| **EPROMS** | | |
| 2764 (8K 300NS) | 3.95 | 5.52 |
| 27128 (16K 250NS) | 8.95 | 11.27 |

| | | | |
|---|---|---|---|
| **BBC ROM UTILITY SOFTWARE** | | | |
| Wordwise (Word-processor) | | 31.75 | 37.50 |
| Wordwise Plus | (Word-processor) | 39.70 | 46.75 |
| View | (Word-processor) | 43.68 | 51.21 |
| Ultracalc II | (Spreadsheet) | 56.49 | 65.95 |
| Printmaster | (Printer graphics) | 23.25 | 27.75 |
| Graphics ROM | (Extensions to Basic) | 23.25 | 27.75 |
| Help | (on Basic keywords etc) | 17.45 | 21.25 |
| Sleuth | (Basic debugging tool) | 20.15 | 24.15 |
| Communicator | RS432 & terminal) | 47.30 | 55.39 |
| Disc Doctor | (Disc utility) | 27.45 | 32.55 |
| Replica 2 | (Backup tape to disk utility) | 9.60 | 12.00 |
| Betabase | (Database Disk) | 20.88 | 25.00 |
| **COMPUTERS** | | | |
| BBC BD (Model B with Acorn DFS) | | 339.95 | 396.18 |
| Electron | | 104.65 | 124.95 |
| Electron YTV Pack (with recorder, games etc) | | 126.39 | 149.95 |
| Epson PX8 (portable, CP/M) | | 677.00 | 783.22 |
| Epson HX20E (executive portable) | | 564.84 | 654.17 |
| Epson PX8 with 120K RAM Disk | | 795.00 | 924.15 |

QFS 2.0
BBC DISC
INTERFACE



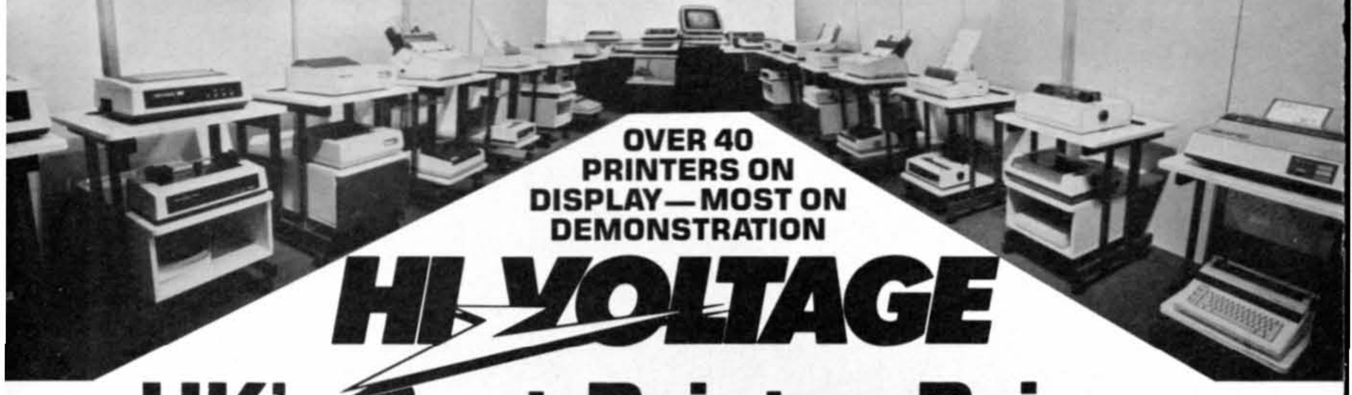
£69.95

Inc. VAT and Carriage.

- Acorn compatible, single density (10 sectors per track).
- Double Density (18 sectors per track).
- Runs protected software (Elite, Mini-Office, etc).
- 16K ROM includes FORMAT.
- Manual and simple fitting instructions.

# LONDON'S LARGEST DISPLAY OF PRINTERS MONITORS COMPUTERS AND PERIPHERALS

**DON'T TAKE A CHANCE** **—COMPARE BEFORE YOU BUY**



**OVER 40 PRINTERS ON DISPLAY—MOST ON DEMONSTRATION**

**HI-VOLTAGE**

OPEN MONDAY-SATURDAY 9 AM-6 PM

# UK's Best Printer Prices

## DOT MATRIX PRINTERS

| | | |
|---|---|---|
| Brother HR5 | £83.44 + VAT = | **£95.95** |
| Brother M1009 | £155.90 + VAT = | **£179.29** |
| Brother EP44 typewriter | £189.90 + VAT = | **£218.39** |
| Epson P40 Thermal AC/DC | £83.44 + VAT = | **£95.95** |
| Epson RX80/FX100/RX100 | POA | |
| Epson LX80 NLQ (New) | £215.60 + VAT = | **£247.95** |
| Epson LQ1500 NLQ | £895.90 + VAT = | **£1030.28** |
| Epson JX80 Colour | £449.90 + VAT = | **£517.39** |
| Canon PW1080A NLQ | £289.90 + VAT = | **£333.39** |
| Canon PW1156A NLQ | £365.90 + VAT = | **£420.79** |
| Canon PJ1080A Colour | £479.90 + VAT = | **£551.88** |
| Commodore MPS801 | £86.87 + VAT = | **£99.90** |
| Commodore MPS803 | £121.70 + VAT = | **£139.95** |
| Panasonic KP1091 NLQ | £255.90 + VAT = | **£294.29** |
| Oki-Mate 20 Colour | £235.90 + VAT = | **£271.29** |
| Shinwa CPA80 | £199.90 + VAT = | **£229.88** |
| Micro P. 165 NLQ | £260.78 + VAT = | **£299.90** |
| Seikosha GP50S (Sinclair Spectrum) | £79.90 + VAT = | **£91.88** |
| Seikosha GP500A | £99.90 + VAT = | **£114.89** |
| Smith Corona Fastext 80 | £139.05 + VAT = | **£159.90** |
| Smith Corona D100, D200 NLQ & D300 NLQ | | POA |
| Star SG10 (IBM) NLQ | £254.90 + VAT = | **£293.14** |
| Kaga Taxan KP810 NLQ | £249.90 + VAT = | **£287.39** |
| Kaga Taxan KP910 NLQ | £379.90 + VAT = | **£436.89** |

## DAISYWHEEL PRINTERS

| | | |
|---|---|---|
| Brother HR10 | £249.90 + VAT = | **£287.39** |
| Brother HR15 (P) | £324.90 + VAT = | **£373.64** |
| Brother HR25 | POA | |
| Brother HR35 + sheet feed | £819.90 + VAT = | **£942.89** |
| Daisystep 2000 | £219.90 + VAT = | **£252.89** |
| Diablo 630 | POA | |
| Silver Reed | | POA |
| Juki 6000 | £199.90 + VAT = | **£229.89** |
| Juki 6100 | £324.90 + VAT = | **£373.64** |
| Juki 2200 typewriter (P or S) | £269.90 + VAT = | **£310.39** |
| Smith Corona TP1 | £179.90 + VAT = | **£206.89** |
| NEC, Rioch, Qume, Tec | | POA |
| Epson DX100 | £339.90 + VAT = | **£390.89** |
| Commodore DPS1101 | £173.00 + VAT = | **£198.95** |
| Uchida DWX 305 | £186.91 + VAT = | **£214.95** |

All popular interfaces, cables, etc. available from stock. Custom cables made to order.

Let our experts match your computer to the printer of your choice.

Printers — All models parallel-centronics interface Serial RS232C available at same or slightly higher prices.

## MONITORS

| | | |
|---|---|---|
| **Microvitec Colour** | | |
| 1431 DS STD RES RGB | £169.90 + VAT = | **£195.39** |
| 1431 DZ STD RES Spectrum | £199.90 + VAT = | **£229.89** |
| 1451 DS MED RES RGB | £229.90 + VAT = | **£264.39** |
| 1451 DQ MED RES QL | £229.90 + VAT = | **£264.39** |
| 1451 APDS MED RES RGB/Composite | £289.90 + VAT = | **£333.39** |
| 1441 DS High RES RGB | £389.90 + VAT = | **£448.39** |
| 1456 LI MED RES IBM PC | £395.90 + VAT = | **£455.29** |
| 1456 DA MED RES Apricot | £349.90 + VAT = | **£402.39** |
| **Ferguson Monitors** Full Range | | POA |
| **Philips Monitors (Monochrome)** | | |
| BM 7502 Green | £78.22 + VAT = | **£89.95** |
| BM 7522 Amber | £86.91 + VAT = | **£99.95** |
| **Philips Monitors (Colour)** | | |
| CM 8500 Comp. STD RES | £191.26 + VAT = | **£219.95** |
| CM 8501 RGB STD RES | £208.65 + VAT = | **£239.95** |
| CM 8524 RGB/Comp STD RES | £243.43 + VAT = | **£279.95** |
| CM 8533 RGB/Comp/IBM MED RES | £278.22 + VAT = | **£319.95** |

## BBC COMPUTERS + SOFTWARE

| | | |
|---|---|---|
| BBC B | £299.90 + VAT = | **£344.89** |
| BBC + DFS | £346.90 + VAT = | **£398.95** |
| BBC B PLUS 128K | £429.90 + VAT = | **£494.39** |
| **ROMS** | | |
| View | £45.90 + VAT = | **£52.79** |
| Graphics | £27.90 + VAT = | **£32.09** |
| Disc Doctor | £27.90 + VAT = | **£32.09** |
| Wordwise Plus | £46.90 + VAT = | **£53.94** |
| Communicator | £57.90 + VAT = | **£66.59** |
| Printmaster | £27.90 + VAT = | **£32.09** |
| Caretaker | £27.90 + VAT = | **£32.09** |
| Logo | £59.90 + VAT = | **£68.89** |
| AMX Mouse | £68.50 + VAT = | **£78.78** |
| Hard tinted perspex dust cover | £11.90 + VAT = | **£13.69** |
| Acorn DFS | £86.91 + VAT = | **£99.95** |
| Opus Double Density DFS | £78.22 + VAT = | **£89.95** |
| **Cumana and Opus Disk Drives** | | |
| 1 x 100K | £84.74 + VAT = | **£97.45** |
| 1 x 400K Switchable | £127.13 + VAT = | **£146.20** |
| 2 x 100K | £186.48 + VAT = | **£214.45** |
| 2 x 400K Switchable | £279.74 + VAT = | **£321.70** |
| Opus Disk Drives now with 2 Year Guarantee | | |
| **Torch** 2 x 400K D. Drive | £173.87 + VAT = | **£199.95** |

## SUPERDISKS Prices per box of ten ex VAT

| | SSDD 40TR | DSDD 40TR | SS96TP1 80TR | DS96TP1 80TR |
|---|---|---|---|---|
| BASF 5¼" | **£10.00** | **£17.80** | **£18.50** | **£21.00** |
| 3M 5¼" | **£13.50** | **£19.50** | **£19.90** | **£23.90** |
| VERBATIM 5¼" | **£14.50** | **£18.40** | **£18.40** | **£24.50** |
| DYSAN 5¼" | **£15.90** | **£23.50** | **£23.50** | **£28.50** |
| TDK 5¼" | **£17.50** | **£16.90** | — | **£32.00** |
| SONY DS/DD 3½" | | **£37.50** | MAXELL 3" | **£38.90** |

Add 70p for P&P per order of Disks or Ribbons

## PRINTER RIBBONS (Ex-VAT Prices)

| | | | |
|---|---|---|---|
| Single prices, less 10% for 5+ | | Epson MX/RX/FX-80 | £3.50 |
| Brother HR15 Corr | £2.90 | Epson 100 Series | £4.50 |
| Brother HR15 MS | £5.50 | Juki 6100 SS | £1.90 |
| Brother HR5 | £2.90 | Juki 6100 MS | £3.80 |
| Brother EP44 | £2.90 | Juki 2200 | £3.80 |
| Brother M1009 | £3.90 | Kaga KP810 | £9.50 |
| Canon PW1080A | £9.50 | Mannesman MT80 | £6.50 |
| CBM 801 | £6.90 | Seikosha GP50 | £6.90 |
| CBM 802/1526 | £6.50 | Seikosha GP100 | £4.50 |
| CBM 1525 | £4.50 | Seikosha GP500 | £6.90 |
| CBM DPS1101 MS | £3.80 | Seikosha GP700 | £18.50 |
| Daisystep 2000 | £3.90 | Shinwa CP80 | £6.50 |

Also in stock Diablo, Anadex, Qume, NEC, Ricoh & OKI Ribbons.

**All equipment fully guaranteed—Credit terms available**

**Mail Order + Export + Trade**
**Hot Line Phone 01-686 6362**

☎ Delivery by Securicor (3 day) please add £5.00 + VAT per item.
Delivery by T.N.T. (overnight) please add £9.50 + VAT per item.

Send off or order by 'phone quoting your Access, Barclaycard No. 'Phone 01-686 6362. Immediate despatch on receipt of order or cheque clearance.

VISA

Or you can Telex your order on: 946240 Attn 19001335

OPEN MONDAY-SATURDAY 9 AM-6 PM

**ALSO VAST RANGE OF DISK DRIVES, JOYSTICKS, DISK BOXES, INTERFACES, SHEETFEEDERS, ETC.**

**HI-VOLTAGE** 53-59 High Street, Croydon, Surrey CR0 1QD.

Prices correct at copy date. Subject to change without notice due to currency fluctuations etc. E. & O.E.

# DESIGNED BY COMPUTER EXPERTS FOR COMPUTER USERS

Getting down to business can now be an attractive proposition with the Apollo business desk range from Opus Supplies. Our stylish computer furniture is extremely accommodating and with prices that start from as little as £100 you'll save both space and money.

Apollo desks – ten models to suit any office computer system – combine sturdy construction and scratch resistant surfaces to ensure they stay looking good no matter how tough the environment.

Designed by computer experts for computer users, the British-built Apollo desking range offers total flexibility. We provide 60° and 90° sturdy desk links to combine workstations easily and firmly together, optional left or right handed drawers, printer tables, paper-feed channels, lockable castors, and even a top model with four-way electrical junction box and hidden cable management.

We also guarantee fast, free delivery and generous dealer, government and education discounts.

Call us on 0737-65080 for further details of the Apollo business desk range or simply post the coupon below.

To: Opus Supplies Limited, 55 Ormside Way, Holmethorpe Industrial Estate, Redhill, Surrey. or phone us on: 0737 65080

Please send details and brochure of the Apollo business desk range ☐ (please tick)
or please send me the address of your nearest stockists ☐

Name____________________
Address____________________
____________________
____________________
Telephone____________________
____________________ MU 11

**Opus.**
Opus Supplies Ltd.

# VIEWST

## JIM NOTMAN welcomes a happy addition to the View family

**WHEN choosing a word processor, spreadsheet or database, it's best to choose a "family" of software that will look and act similarly with similar commands.**

This makes learning each program easier and it is less likely that mistakes will be made. Also you'll be able to transfer data from one program to another, for example from a spreadsheet to a word processor.

The well-established View family of software from Acornsoft has a recent addition, ViewStore, a database. The main part of the software is supplied on a 16k eprom for installation in a paged ROM socket. It is called up by typing *STORE.

The command page it enters looks very like those of its close relatives View and Viewsheet. Fortunately an example database is supplied as an easy introduction to what at first seems a very complex piece of software.

It also gives many ideas of how the software can be used, and is a useful starting point for this review.

To load the example database you enter LOAD CARS. The top of the page will then change to show how much memory is free and which file is being looked at.

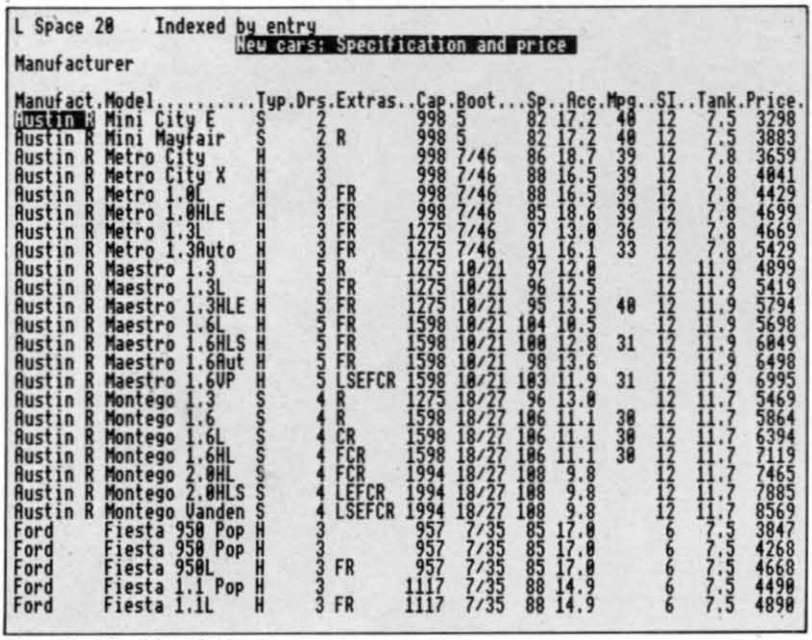
```
Viewstore
Bytes free 23580
Editing D.CARS
Format F.CARS
Screen Mode 7
=>
```

*Figure I: Command page*

To enter the database display press the Escape key. Some of the data from CARS will be loaded. The way it's displayed is interesting, appearing very much as if you were looking through a window onto a spreadsheet with its typical rows and column appearance, as you'll see from Figure II.

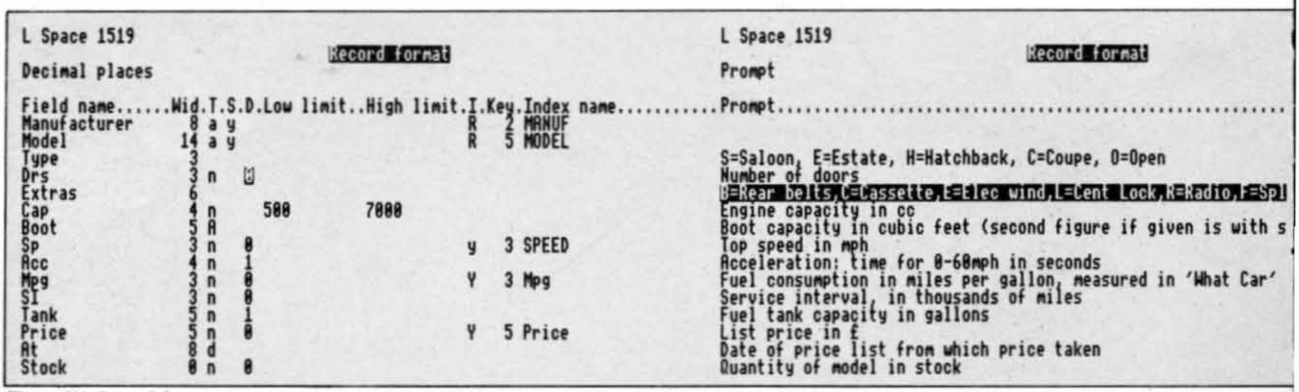
Each horizontal line displays one record of the file and within each record there are a number of fields. The cursor keys permit easy movement around the database allowing scrolling upwards and downwards through different records as well as sideways through different fields.

As you reach the edge of the screen the window moves over allowing you to see all the fields of a record. Mode 0, with its 80 columns, can be used here to display the maximum amount of information on the screen, as only a small part of the database needs to be loaded into memory at any time.



```
L Space 20    Indexed by entry
                    New cars: Specification and price
Manufacturer

Manufact.Model..........Typ.Drs.Extras..Cap.Boot...Sp..Acc.Mpg..SI..Tank.Price.
Austin R Mini City E    S     2          998 5      82 17.2  40  12   7.5  3298
Austin R Mini Mayfair   S     2 R        998 5      82 17.2  40  12   7.5  3883
Austin R Metro City     H     3          998 7/46   86 18.7  39  12   7.8  3659
Austin R Metro City X   H     3          998 7/46   88 16.5  39  12   7.8  4041
Austin R Metro 1.0L     H     3 FR       998 7/46   88 16.5  39  12   7.8  4429
Austin R Metro 1.0HLE   H     3 FR       998 7/46   85 18.6  39  12   7.8  4699
Austin R Metro 1.3L     H     3 FR      1275 7/46   97 13.0  36  12   7.8  4669
Austin R Metro 1.3Auto  H     3 FR      1275 7/46   91 16.1  33  12   7.8  5429
Austin R Maestro 1.3    H     5 R       1275 10/21  97 12.0      12  11.9  4899
Austin R Maestro 1.3L   H     5 FR      1275 10/21  96 12.5      12  11.9  5419
Austin R Maestro 1.3HLE H     5 FR      1275 10/21  95 13.5  40  12  11.9  5794
Austin R Maestro 1.6L   H     5 FR      1598 10/21 104 10.5      12  11.9  5698
Austin R Maestro 1.6HLS H     5 FR      1598 10/21 100 12.8  31  12  11.9  6049
Austin R Maestro 1.6Aut H     5 FR      1598 10/21  98 13.6      12  11.9  6498
Austin R Maestro 1.6VP  H     5 LSEFCR  1598 10/21 103 11.9  31  12  11.9  6995
Austin R Montego 1.3    S     4 R       1275 18/27  96 13.0      12  11.7  5469
Austin R Montego 1.6    S     4 R       1598 18/27 106 11.1  30  12  11.7  5864
Austin R Montego 1.6L   S     4 CR      1598 18/27 106 11.1  30  12  11.7  6394
Austin R Montego 1.6HL  S     4 FCR     1598 18/27 106 11.1  30  12  11.7  7119
Austin R Montego 2.0HL  S     4 FCR     1994 18/27 108  9.8      12  11.7  7465
Austin R Montego 2.0HLS S     4 LEFCR   1994 18/27 108  9.8      12  11.7  7885
Austin R Montego Vanden S     4 LSEFCR  1994 18/27 108  9.8      12  11.7  8569
Ford     Fiesta 950 Pop H     3          957  7/35  85 17.0       6   7.5  3847
Ford     Fiesta 950 Pop H     3          957  7/35  85 17.0       6   7.5  4268
Ford     Fiesta 950L    H     3 FR       957  7/35  85 17.0       6   7.5  4668
Ford     Fiesta 1.1 Pop H     3         1117  7/35  88 14.9       6   7.5  4490
Ford     Fiesta 1.1L    H     3 FR      1117  7/35  88 14.9       6   7.5  4890
```

*Figure II: Spreadsheet display*



```
L Space 1519
                      Record format
Decimal places

Field name......Wid.T.S.D.Low limit..High limit.I.Key.Index name..........
Manufacturer      8 a y                         R   2 MANUF
Model            14 a y                         R   5 MODEL
Type              3
Drs               3 n   0
Extras            6
Cap               4 n     500         7000
Boot              5 A
Sp                3 n   0                       y   3 SPEED
Acc               4 n   1
Mpg               3 n   0                       Y   3 Mpg
SI                3 n   0
Tank              5 n   1
Price             5 n   0                       Y   5 Price
At                8 d
Stock             0 n   0
```

```
L Space 1519
                      Record format
Prompt

Prompt.................................................................

S=Saloon, E=Estate, H=Hatchback, C=Coupe, O=Open
Number of doors
B=Rear belts,C=Cassette,E=Elec wind,L=Cent Lock,R=Radio,F=Spl
Engine capacity in cc
Boot capacity in cubic feet (second figure if given is with s
Top speed in mph
Acceleration: time for 0-60mph in seconds
Fuel consumption in miles per gallon, measured in 'What Car'
Service interval, in thousands of miles
Fuel tank capacity in gallons
List price in £
Date of price list from which price taken
Quantity of model in stock
```

*Figure IV: Record format spreadsheet*

# ORE

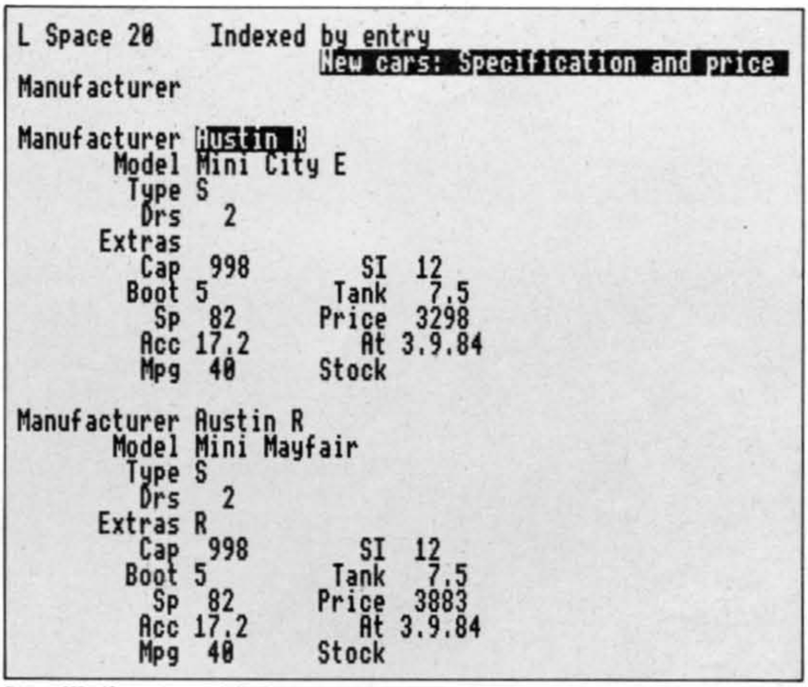
The active field – that is the one you're editing – is shown by reverse video in Modes 0 to 6. As the cursor moves between fields the third line of the screen changes. It displays a prompt which you can define in the Record format – more of which anon. This is especially useful if much of the information is to be coded to minimise storage space.

This spreadsheet method of display allows a large amount of information to be displayed in a very small area. A field may contain more information than is displayed on the spreadsheet. Moving the cursor to the appropriate field, then pressing the Ctrl key and the right and left cursor keys, will allow scrolling within the field. In Figure II for example, the active field shows *Austin R* but scrolling this field will show that the *R* is followed by the letters *over*.

A number of different options are available by pressing different function keys. A function key strip containing the commands is provided.

If you find a spreadsheet display too confusing, you can press the change display function key to reveal the alternative card display shown in Figure III. As you can see, this is far more typical of other database displays.

The spreadsheet formats can be examined at any time simply by pressing the relevant function keys. In a wheels-within-wheels manner you determine the format of the spreadsheet display by making use of a record format spreadsheet as shown in Figure IV. This controller is actually three 80 column screens and as you can see these contain a large amount of information. As with the main spreadsheet a prompt is always displayed on the third line of the screen giving any relevant information.



```
L Space 20    Indexed by entry
                          New cars: Specification and price
Manufacturer

Manufacturer Austin R
       Model Mini City E
        Type S
         Drs  2
      Extras
         Cap  998          SI  12
        Boot 5           Tank   7.5
          Sp  82        Price  3298
         Acc 17.2          At 3.9.84
         Mpg  40        Stock

Manufacturer Austin R
       Model Mini Mayfair
        Type S
         Drs  2
      Extras R
         Cap  998          SI  12
        Boot 5           Tank   7.5
          Sp  82        Price  3883
         Acc 17.2          At 3.9.84
         Mpg  40        Stock
```

*Figure III: Alternative card display*

Each field is given a name to be printed at the top of the spreadsheet you're designing. The width of each field is given, even 0 if the field is not to be displayed and the data type specified as numeric, alphanumeric, date and so on. If decimal numbers are to be used, the number of decimal places can also be specified.

A valuable aid to input error checking is the ability to give maximum and minimum values, or a list of the only values acceptable, for all types of variables.

Indexes can be defined. These are extra files which enable you to find data more quickly. For instance, you could keep an index of the model name of the cars in their alphabetical order.

The key field shows that only the first five letters of the field are stored in the index file for this purpose. Once the main record format card is designed the card layout (Figure V) can be planned.

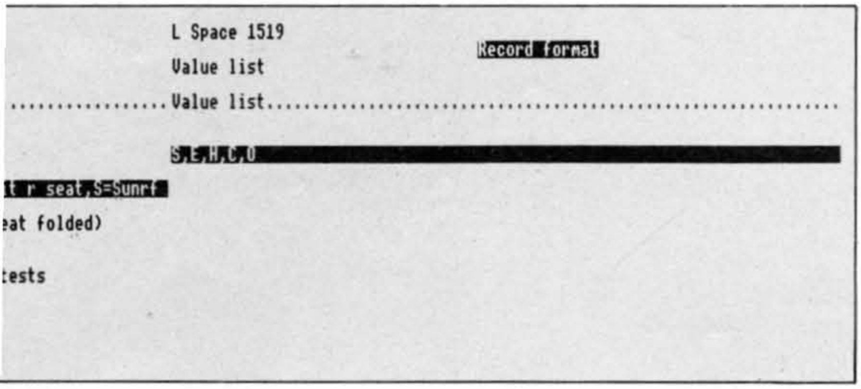
When a database is newly defined all the field names and the length of their screen input is placed in a continuous stream at the top of the screen. To place the field names where you want them simply move the cursor over the field name, press the Copy key then move the cursor to where the field name should go and press the Copy key again.

The database header (Figure VI) controls other functions. A title can be defined for the top of the input sheets. Display refers to whether the database should first go to the spreadsheet or card display.

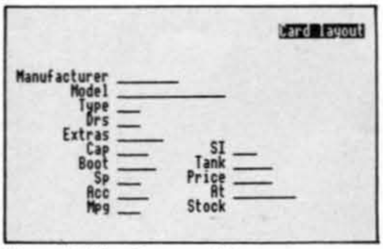
Record size dictates how much space on disc should be made available for each record. This can be done in two ways, either making each record a fixed length or saving some extra space as well as that used when the record is first typed in.

Capacity refers to the number of records to be held in memory. This will

→



```
                L Space 1519
                                       Record format
                Value list
................Value list..............................................................
                S,E,H,C,0
t r seat,S=Sunrf
eat folded)

tests
```



```
                                        Card layout

Manufacturer
       Model
        Type
         Drs
      Extras
         Cap              SI
        Boot            Tank
          Sp           Price
         Acc              At
         Mpg           Stock
```

*Figure V: Planning a card layout*

*From Page 137*

depend on the size of individual records and the amount of free space.

The order the records are displayed in will depend on the index field. If none is specified the input order is the default. The screen mode for display of the data is the last piece of information.

A major limitation on many of the other databases I've seen for the BBC Micro is that not only can they be awkward to set up but that it is difficult, if not impossible, to change the format once it has been defined.

Not here! The database format can be easily changed at any time. Commands for saving and loading the format files separately make it possible to have a number of different format files for each database.

Not all the software is on eprom. A number of utilities are supplied on the demonstration disc, all called from the command page of ViewStore.

They are:

**SORT** allows for complex sorting of particular values in one field, or range of values, or logical comparisons over a number of fields. For example, selecting a car from a particular manufacturer with a top speed over 100 mph OR a price less than £6,000 AND a petrol consumption better than 38 mpg. The results can be displayed on screen or printer. This can take some time especially with a large database and complex sort.

**SETUP** sets up the database.

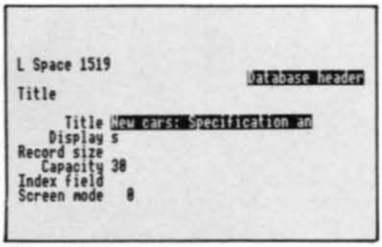
**SELECT** writes selected records to a new file.

**REPORT** produces listings of the database. A pre-defined format file may control this. This utility is able to use simple arithmetic on the numerical fields. For example adding up all the price fields to give a total value.

**MACRO** produces text macros for use in View.

**LINK** extracts numbers from the database to place into a file that can be used by Viewsheet.

**LABEL** prints labels using the data. This is especially handy for name and address databases.



```
L Space 1519
                                   Database header
Title

      Title New cars: Specification an
    Display s
Record size
   Capacity 30
Index field
Screen mode   0
```

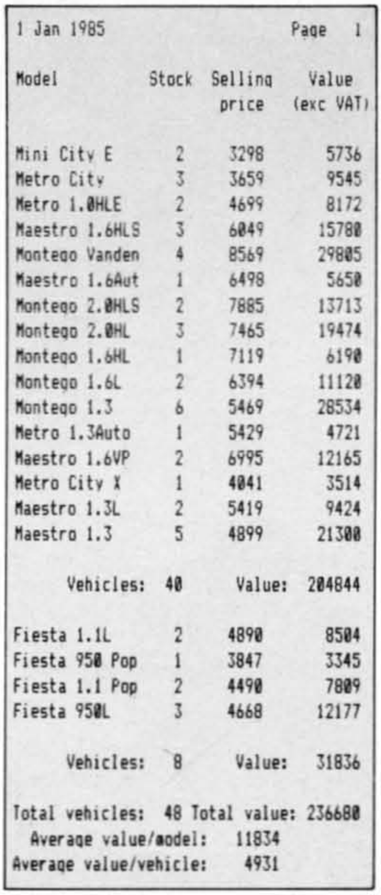
*Figure VI: Database header*

**INDEX** creates new index files.

**CONVERT** can select and sort records to be included in a new database.

These utilities can be programmed using EXEC files. This is very useful if sorts and reports are to be repeated often.

Only one complaint here. There are a different number of responses depending on whether data is to be viewed on the screen or sent to the printer. I found it helpful to set *FX5,0 as printer "drain" to stop wasting paper before enabling the printer with *FX5,1 or *FX5,2 when I had sorted out the details to my own satisfaction. Figure VII shows an example printout using SELECT and REPORT.



```
1 Jan 1985                         Page   1

Model            Stock  Selling     Value
                          price  (exc VAT)

Mini City E          2     3298      5736
Metro City           3     3659      9545
Metro 1.0HLE         2     4699      8172
Maestro 1.6HLS       3     6049     15780
Montego Vanden       4     8569     29805
Maestro 1.6Aut       1     6498      5650
Montego 2.0HLS       2     7885     13713
Montego 2.0HL        3     7465     19474
Montego 1.6HL        1     7119      6190
Montego 1.6L         2     6394     11120
Montego 1.3          6     5469     28534
Metro 1.3Auto        1     5429      4721
Maestro 1.6VP        2     6995     12165
Metro City X         1     4041      3514
Maestro 1.3L         2     5419      9424
Maestro 1.3          5     4899     21300

      Vehicles:  40      Value:  204844

Fiesta 1.1L          2     4890      8504
Fiesta 950 Pop       1     3847      3345
Fiesta 1.1 Pop       2     4490      7809
Fiesta 950L          3     4668     12177

      Vehicles:   8      Value:   31836

Total vehicles:  48 Total value: 236680
  Average value/model:   11834
Average value/vehicle:    4931
```

*Figure VII: Example printout*

**IMPORT** is a Basic program designed to enable data from other databases to be converted into a ViewStore format file.

ViewStore is not necessarily the fastest database. To be able to find records quickly it is dependent on index files. The more that are open the faster it is to find that particular field, but as each index will need to be updated with every record input the response time is slowed. It is possible to add extra index fields after the records have been input.

As it is not possible to implement this sort of database on cassette the ease of use and the capacity of the database are dependent on the DFS (or Econet) and amount of disc storage available.

With a 40 track single sided disc unit you'll be very much more limited than if you have a double sided 80 track disc drive. If you can manage to afford a Winchester hard disc you'll have nothing to worry about.

If you only have the 0.90 DFS then I'd upgrade to the 1.20 DFS (part of the DNFS) as it's up to twice as fast. The ADFS on a Winchester is that much faster again. ViewStore is not just compatible with the 6502 second processor but is also speeded up by it.

Dire warnings appear in the documentation about pressing the Break key while in the display mode. They should be heeded as it is all too easy to corrupt the database. This is a major area of vulnerability.

At least it teaches you good database management technique – always ensuring that there is at least one backup copy! It's a pity a utility was not provided to try to recover from these problems.

The 122 page manual is well written and in conjunction with the example files makes the package easy to learn.

No matter what you read in the media about the BBC Micro, as long as high quality pieces of software like this continue to be written for it, it is far from dead.

**VIEWSTORE is now available with the rest of the View family – View and Viewsheet – at a specially reduced price direct from *The Micro User*.**

**Full details of this special offer are given on Page 191.**

**DISKING** INTERNATIONAL, FREEPOST, Liphook, Hants, GU30 7BR. tel (0428) 722563 [24hrs]

# The **LOWEST** DISKETTE PRICES

## FREE diskette storage

with every ten disks the superb **Flip 'n' File 10** worth £4.49 inc VAT! Or with fifty disks you may choose the superb **'Budget 50'** storage system (worth £10.24 inc VAT) with smoked perspex lid, dividers and non-slip rubber feet.

## LOOK:-

**Prices are per ten-pack, exc VAT but include FREE storage systems.**

| Description | 1-4 ten-packs | 5+ ten-packs |
|---|---|---|
| **BL1D** S/S D/D 48 tpi | 10.00 | 8.58 |
| **BL2D** D/S D/D 48 tpi | 12.00 | 10.58 |
| **BL1DD** S/S Q/D 96 tpi | 12.00 | 10.58 |
| **BL2DD** D/S Q/D 96 tpi | 14.00 | 12.58 |

For specifications see below

## In stock NOW - immediate despatch

FLIP'N'FILE/10
For Floppy Disk Storage and Filing
FLIP'N'FILE/10
STURDY DUST-FREE PROTECTION · FAST EASEL-BACK WORK STATION
0 5¼" FLOPPY DISKS
ATIVE CONCEPTS

To **DISKING,** FREEPOST, Liphook, Hants, GU30 7BR
Please rush me the following order:-

| Qty | Description | Price exc VAT |
|---|---|---|
| | | |
| | | |

I choose the FREE Flip 'n' File 10's [ ] Budget 50 [ ]

Total goods value exc VAT ______
Total delivery & ins. ______
Sub total exc VAT ______
VAT ______
Value of cheque to DISKING ______
or charge our ACCESS or VISA number:-
______

Name: ______
Address: ______
______
______
tel no. ______

welcome

MU9

### How to Order - Government

We welcome orders from all Government bodies including Schools, Colleges, Universities, County Councils, Hospitals, Research Est.'s and the Armed Forces. Simply post or call with your official order no.

### Non-government orders

All individuals and companies both public & private cash with order please. Just send in the completed coupon with your payment, or telephone your credit number 24 hours a day 7 days a week. DON'T WHISPER.

If the coupon's been cut, just send your order on any ol' piece of paper, with what you want, your name & address and your payment.

### U.K. Post & Packing rates

1-2 packs each pack at 95p
3-5 packs each pack at 75p
6-9 packs each pack at 60p
10+ packs POST FREE

### Diskette Specifications

These diskettes are made to our specification by a large reputable manufacturer. They are factory fresh, individually certified and come with envelopes, multicoloured user labels, write protect tabs, and a lifetime warranty. We know you will be deligthed with our products when you buy from us, but in the unlikely event that you are not, you may return the goods for a full refund, no questions asked.

**DISKING** renowned for the best QUALITY - NOW renowned for the BEST PRICES as well.

**DISKING** INTERNATIONAL, FREEPOST, Liphook, Hants, GU30 7BR. tel (0428) 722563 [24 hrs]

# CLARES Nº1 IN UTILITY SOFTWARE!

## *Enhanced* BETA-BASE £25

40 80 3"

WHAT IS A DATABASE?
It is a FILE containing RECORDS, each record consists of a number of FIELDS containing the information—an analogy can be drawn with a card index in which a box of cards is the file, each card is a record and each line on the card is a field.

### SPECIFICATION

| | |
|---|---|
| 1) Random Access | — disc based, single or dual drives. |
| 2) File Sizes | — max 65,000 records. |
| 3) Record Size | — up to a 2048 characters and 200 fields. |
| 4) Field Size | — up to 254 characters. |
| 5) Holds | — approx 1200 ADDRESS records per 100k. |
| 6) Search | — 5 search fields using powerful options. |
| 7) Sort | — 500 records on 3 fields in 60 seconds. |

### SYSTEM FEATURES

★ CALCULATE—using any valid expression and store results.
★ POWERFUL PRINTOUT OPTION—eliminates need for separate mailing program, parallel/Serial Printout allows setting of printer control codes, line spacing, tabulation, Headings etc., plus label printing with horizontal and vertical tab control.
★ REDEFINE—Titles, field widths, number of fields, number of records etc.
★ TRANSFER—Records from one file to another.
★ SEARCH LISTS—Allow creation of sub Databases within main Database.
★ GLOBAL ENTRY—provides easy entry of repetitive data and a powerful global edit/update facility that will save hours of typing.
★ SPOOLER—enables you to create spooled files that are compatible with Wordwise, View and other word processors. The spooler program will allow you to format your spooled file in the same way as the powerful printout option. You can therefore have headings, columns, titles, numbers etc.
★ INPUT—is a routine included on the disc which will allow you to write your own utilities for accessing your data. Many of the programs on the coming utilities disc were written using this procedure.
★ TUBE—compatible with the 6502 second processor.
★ Comprehensive manual and tutorial.

**Beta-Base Utilities disc** containing many advanced features such as full disc sort, AND/OR search on 10 fields, wildcards, mail merge + many other features.

### Available Now £12

"Beta-Base is a joy to use"
BEEBUG March 85

"Excellent value for money"
A & B Computing OCT 84

"rated best value for money"
ACORN USER Dec 84

clares
MICRO SUPPLIES

## REPLICA II £12.00

40 80 3"

In addition to working with the standard single density DFS's REPLICA II is now compatible with the following double density DFS: OPUS 3.45, UDM v. 2.00 and CUMANA QFS.

The original REPLICA set a very high standard so the specification that we set our chief programmer presented him with a real challenge. In fact REPLICA II is now 2 separate programs, one for DFS using the 8271 controller and the other for the various DDFS that fully implement OSWORD &7F. REPLICA II will transfer many of your cassette based programs to disc, even more than REPLICA did. Now when you buy disc drives you do not have to throw away your expensive cassette based programs.

REPLICA II transfers 'LOCKED' programs, programs loading as files, programs that load below &E00, those with up to 9 sections and those up to &6E in length e.g. adventure programs. No more waiting for 6 minutes whilst your adventure programs load.

REPLICA II is very easy to use and the user just enters a name, how many sections and whether CHAIN, *RUN or *LOAD is used to load the first section. Press play and let the program do the rest, even a menu. Just think how much it will cost you to buy a disc version of your favourite program—it is probably more than REPLICA II, which will hold up to 16 programs, limited only by the disc capacity and catalogue.

**STATE DFS & 40 or 80 tracks**

## *New!* PROFILE £12.00

40 80 3"

### A PROCEDURE LIBRARY MANAGEMENT SYSTEM

Now you can start the procedure library that you always promised yourself. PROFILE allows you to store, list, merge and grab procedures without any of the headaches. Automatic alteration of LINE NUMBERS and resident variables such as TOP, LOMEM etc release you from the tedious chore of setting and resetting, checking and rechecking. PROFILE leaves you free to create your programs without disturbing your chain of thoughts.

★ 100 Procedures can be stored on each disc (disc space allowing)

★ NO LIMIT to the number of procedure discs used

★ MERGE Procedures into your programs easily

★ LIST Procedures from disc to check suitability etc

★ RENAME Procedures on disc

★ GRAB new Procedures from existing programs

★ NESTED Procedures can also be grabbed automatically

A Procedure can be a FUNCTION, a BASIC program or part of it or a PROCEDURE.

With PROFILE you will quickly amass a wealth of procedures which will enable you to write programs quickly and easily. Simply write the controlling program containing the procedure calls and PROFILE will merge the procedures for you.

PROFILE in effect provides you with a MACRO BASIC in which you only have to define the procedure once and it can be re-used automatically thereafter.

Make life easier for yourself and order PROFILE today.

**98 Middlewich Rd.,**
**Northwich, Cheshire CW9 7DA.**
**Tel: 0606 48511**
**Open 9—5pm Monday—Friday**
**LUNCH 12.30—1.30**

## *New!* BETA-ACCOUNTS INVOICE & DELIVERY NOTE MODULE £25.00

40 80 3"

This is the first module in an integrated accounting suite of programs written to be used and not simply to please an accountant. This module contains an INVOICE and DELIVERY NOTE program with 80 column input and screen editing, you see what will be printed before committing yourself. Account customer details are inserted automatically and delivery notes generated automatically when required. Customer details without account numbers can be automatically placed in a Beta-Base compatible file for use as a mailing list.

A sales ledger sheet is printed automatically when there is enough data to fill a page, alternatively the user can print the ledger sheet before a full page to suit his needs. VAT details are generated at the end of the VAT period and the year to date figures can be viewed at any time. Provision is made for multiple VAT rates including standard, zero, export and exempt.

A transaction file is generated for account customers for use with the STATEMENTS and ACCOUNTS RECEIVABLE module.

Future modules will be STATEMENT and ACCOUNTS RECEIVABLE, STOCK CONTROL, ACCOUNTS PAYABLE and NOMINAL LEDGER. All relative files are compatible with CLARES Beta-Base which can be used to manipulate the files as required. A Beta-Base Utilities Disc will soon be available and will provide Mail-Merge facilities and links into ULTRACALC plus many other features.
★ INTEGRATED ACCOUNTS and DATABASE
★ MULTIPLE VAT rates
★ SCREEN EDITING with insert & overwrite
★ AUTOMATIC DELIVERY NOTES
★ INVOICE COMMENTS
★ ACCOUNT HOLDERS details inserted automatically
★ MAILING LIST generated automatically
★ LEDGER SHEET printed automatically
★ VAT sales returns prepared
★ TRANSACTION FILE generated
★ Beta-Base compatible
This program was written for our own use and is used to prepare hundreds of invoices per week. It has no unnecessary questions or keys to press and extensive but easy edit options, we have made life as easy as possible for ourselves so why not take advantage of our efforts.

Requires double sided single or twin single sided drives for minimum configuration -no stock control or customer database. Double sided twin drives will enable a full integrated system to be used.

## FUN HOUSE £10.00

40 80 3"

FUN HOUSE is a highly original suite of educational programs suitable for ages 3 to 13. The program is designed to encourage children to spell words which relate to objects found around the home. Animation and music are used to good effect and some highly original ideas are incorporated. Each room exercise is terminated with a warning item e.g. the lounge finishes with 'FIRE' which goes on to engulf the whole lounge. Tests with a newly hired 4 year old resulted in us having to prise him away from the keyboard after 2 hours. In that time he had gone from never having used a keyboard to finding the location of all the keys very quickly and entering the correct answer. He had thus started on the path to learning spelling and familiarised himself with the keyboard including the use of DELETE to correct his mistakes. Can you afford not to give your children the same start?

Send for detailed newsletter.
All prices inclusive of VAT & Carriage—
NO EXTRAS! Please state 40 or 80 track disc and state which D.F.S. you use

# BROM

## 21 EXTRA COMMANDS

## THE NUMBER ONE

TOOLKIT ROM
FROM CLARES

**BROM** EPROM £34.50 | 40 80 ○ 3" £27.50

BROM is the first toolkit ROM to provide a FULL SCREEN EDITOR, which means that you can scroll your program up and down just like WORDWISE does with text, do not confuse this powerful editor with the line editor used in other toolkit ROMs. The EDITOR allows insertion and deletion of lines and insert and overwrite within a line. This is the editor that the BBC micro should have had.

Closely related to the EDITOR is the EXTENDED ERROR HANDLING which will trap errors in a program and enter the EDITOR at the line generating the error, not only that but it will also position the cursor as near to the statement causing the error as possible, no more wading through multi statement lines trying to identify the error.

Commands unique to BROM are:

ROMON & ROMOFF which enable you to turn on/off sideways ROMs so that they stay off even after CTRL/BREAK, very useful for avoiding clashes especially for users with second processors. This also works with the DFS and reverts to PAGE &E00 automatically.

CASE which forces input into upper or lower case irrespective of caps/shift lock.

FLIST which lists a program one statement to a line but more importantly it will even list 'BAD PROGRAMS.'

ONEKEY is a single key entry option but you can also define your own strings to any ASCII key, just like an extra 48 function keys.

Another group of commands provide FIND and selective or global SEARCH and REPLACE facilities. These commands work with strings and keywords or a mixture of both e.g. "*FIND PROChelp T', will list the full line containing PROChelp, the 'T' simply tokenizes any keywords.

Yet another group of commands allow lines to be moved or copied to a new location.

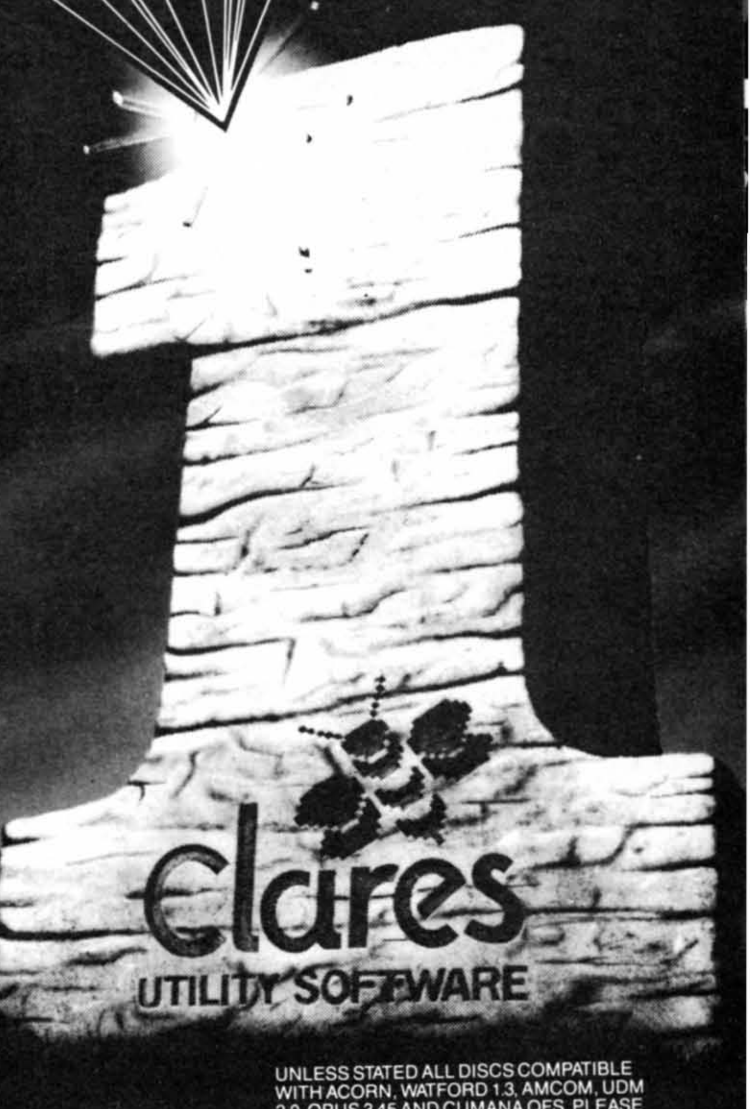
The other commands provide function key editor, 'BAD PROGRAM' cure, variable lister, integer variable flush, program compacter etc.

This is a genuinely useful ROM that no user should be without. Be warned, once used you will not be able to live without it!

"...this is the best On-Screen BASIC Editor I have ever used; it is far superior to BEEBUG softs Toolkit."

Viewfax Tubelink

The Brom disc is suitable for use with SOLIDISK SIDEWAYS RAM.



40 80 ○ 3" — DISC
40 — 40 TRACK
80 — 80 TRACK
3 — 3" DISC—ADD £3
EPROM — EPROM

UNLESS STATED ALL DISCS COMPATIBLE WITH ACORN, WATFORD 1.3, AMCOM, UDM 2.0, OPUS 3.45 AND CUMANA QFS. PLEASE RING FOR COMPATIBILITY WITH OTHER DFS.

# GRIFFEN COMPUTERS

TEL 0279 812295

8 RAINSFORD ROAD, STANSTED, ESSEX CM24 8DU

## SPECIAL OFFERS – SPECIAL OFFERS

**Phone to check these are our latest prices**
**Quantity discounts available**

| | |
|---|---|
| **HITACHI 27128 250 nS** | **3.50 inc VAT(a)** |
| **HITACHI 2764 250 nS** | **2.40 inc VAT(a)** |
| **HITACHI 6264LP15 RAM** | **4.75 inc VAT(a)** |
| **INTEL 8271** | **45.00 inc VAT(a)** |
| **ACORN DNFS KIT** | **68.95 inc VAT(a)** |
| **ADVANCED TOOLKIT ACP** | **33.00(b)** |
| **ACORN 1770 DFS UPGRADE KIT** | **46.95(b)** |
| **ACORN ADFS UPGRADE** | **27.95(a)** |
| **ACORN GRAPHICS ROM** | **27.50(b)** |
| **ACORNSOFT BASIC EDITOR** | **28.95(b)** |
| **ACORNSOFT VIEWSTORE** | **54.95(b)** |
| **ACORNSOFT VIEW** | **47.95(b)** |
| **ACORNSOFT VIEWSHEET** | **47.95(b)** |
| **ACORNSOFT VIEW 3** | **79.95(c)** |
| **ACORNSOFT TERMULATOR** | **31.95(b)** |

**The latest releases from Computer Concepts**

| | |
|---|---|
| **ACCELERATOR** | **57.95(b)** |
| **INTERSHEET** | **47.95(b)** |
| **INTERCHART** | **31.95(b)** |
| **SPEECH ROM** | **28.95(b)** |
| **WORDWISE PLUS** | **44.95(c)** |

| | |
|---|---|
| WORDEASE | 19.95(b) |
| EXMON II B/E | 26.25 (b) |
| TOOLKIT B/E | 24.65 (b) |
| SPELLCHECK II 40/80 | 28.60 (b) |
| SLEUTH | 26.25 (b) |
| MUROM | 26.25 (b) |
| HELP | 22.00 (b) |
| WORDWISE | 36.00 (c) |
| PRINTMASTER EPSON/STAR | 27.50 (b) |
| GRAPHICS EXTENSION | 27.50 (b) |
| DISC DOCTOR | 27.50 (b) |
| ISO-PASCAL | 59.95(d) |
| LOGO | 59.95(d) |
| COMAL | 45.00 (d) |
| VIEW PRINTER DRIVER GENERATOR | 11.00 (b) |
| HI-VIEW | 44.95(b) |
| ADDCOMM B/E | 26.75 (b) |
| CLARES BROM | 29.95(b) |
| PROXIMA BEEB-TEXT 40/80 | 14.00 (b) |
| SPELLCHECK WW/VIEW 40/80 | 16.20 (b) |
| MASTERFILE II 40/80 | 17.50 (b) |
| CLARES BETABASE 40/80 | 21.95(a) |
| BETABASE UTILITY DISC 40/80 | 11.00(a) |
| CLARES REPLICA II | 11.00(a) |
| CLARES PROFILE | 11.00(a) |
| CLARES BETA-ACCOUNTS | 21.95(a) |
| UDM DDFS Ver.3.1 | 59.95(b) |
| UDM 100% BOARD + SWITCH | 17.50 (b) |
| UDM ROM EXPANSION BOARD | 55.00 (b) |
| A.T.P.L. ROM EXPANSION BOARD | 37.95 (b) |
| 40TR S/S C.D.C. | 13.95(b) |
| 40TR D/S C.D.C. | 15.45(b) |
| 80TR S/S C.D.C. | 16.95(b) |
| 80TR D/S C.D.C. | 18.45(b) |
| 80TR D/S IN SEE - 10 BOX | 11.95(b) |

**All prices include V.A.T., @ 15%** **B/E – BBC/Electron**

Postage rates – (a) 50p (b) 75p (c) £1.25 (d) £2.00

Dealer enquiries welcome

---

# Highest Quality Lowest Prices Free Delivery

To produce the highest quality at the best prices you need to be one of the world's largest manufacturers. The Control Data Corporation employs 58,000 people and has a turnover world-wide in excess of £3,000,000,000. That makes them one of the biggest. It also means that they can afford the very latest and best equipment to ensure that their stringent quality control procedures at their factory in South Wales guarantee that C.D.C. StorageMaster disks are second to none. This is why we agreed to become official distributors for StorageMaster disks — the highest quality — the best prices. And now we are passing these advantages to you.

## Branded StorageMaster Disks from 98p

| Prices per box of 10 (excl VAT) | | 1-4 | 5-9 | 10-24 | 25-49 | 50+ |
|---|---|---|---|---|---|---|
| 402.002 | SS/DD 48 tpi | **11.90** | **11.20** | **10.80** | **10.30** | **9.80** |
| 402.003 | DS/DD 48 tpi | **14.90** | **13.90** | **13.40** | **12.90** | **12.40** |
| 402.005 | DS/QD 96 tpi | **19.90** | **18.90** | **17.90** | **17.40** | **16.90** |
| 409.002 | See10 5¼" Lib Case each | **2.30** | **2.05** | **1.95** | **1.85** | **1.75** |

## Bulk StorageMaster Disks from 85p

Full specification disks from Control Data (same disks as above) but supplied in bulk form. No brand-labels, no boxes, no envelopes. Factory shrink-wrapped in 25s & 50s. Suppled only in multiples of 50.

| Prices each (excl VAT) | | 50-200 | 250-450 | 500-950 | 1000+ |
|---|---|---|---|---|---|
| 402.102 | SS/DD 48 tpi | **0.97** | **0.92** | **0.88** | **0.85** |
| 402.103 | DS/DD 48 tpi | **1.35** | **1.25** | **1.15** | **1.05** |
| 402.105 | DS/QD 48 tpi | **1.60** | **1.50** | **1.40** | **1.30** |
| | | 5+ | 25+ | 50+ | 100+ |
| 495.055 | Pk of 10 Tyvek envs | **0.90** | **0.80** | **0.70** | **0.60** |
| 495.050 | Pk of 20 labels + w/p tabs | **75p** | **55p** | **45p** | **35p** |
| | | 1+ | 5+ | 10+ | 25+ |
| 409.080 | Economy 50 Stg Case | **7.95** | **6.95** | **5.95** | **5.45** |
| 409.050 | Exec. 50 Stge case, lock | **15.95** | **14.95** | **13.95** | **12.95** |
| 409.082 | Econ. 100 Stge case, lock | **16.95** | **15.95** | **14.95** | **13.95** |
| 409.051 | Exec. 100 Stge case, lock | **21.95** | **20.95** | **19.95** | **18.95** |

## Branded Fuji 3½" Disks from 2.19

| Prices per box of 10 (excl VAT) | | 1-4 | 5-9 | 10-24 | 25-49 | 50+ |
|---|---|---|---|---|---|---|
| 405.011 | MF1DD Single sided 135 tpi | **27.90** | **25.90** | **23.90** | **22.90** | **21.90** |
| 405.012 | MF2DD Double Sided 135 tpi | **36.90** | **34.90** | **33.90** | **32.90** | **31.90** |
| 409.001 | See10 3½" Library case each | **2.30** | **2.05** | **1.95** | **1.85** | **1.75** |

## Bulk Fuji 3½" Disks from 1.86

Full specification Fuji Film 3½" disks supplied in bulk form. No brand labels, packed in boxes of 100.

| Prices each (excl VAT) | | 100+ | 300+ | 500+ | 1000+ |
|---|---|---|---|---|---|
| 405.111 | MF1DD SS 135 tpi | **2.05** | **1.98** | **1.92** | **1.86** |
| 405.112 | MF2DD DS 135 tpi | **2.80** | **2.70** | **2.60** | **2.50** |
| | | 1+ | 10+ | 25+ | 100+ |
| 409.081 | Economy 30 Stg case | **5.95** | **5.50** | **4.95** | **4.45** |
| 409.060 | MD60T 60dsk Stg Case, lock | **15.95** | **14.95** | **13.95** | **12.95** |

## AMSOFT 3" floppies from 3.45

Double sided 3" disk, reversible for single sided 3" drives

| Prices each (excl VAT) | | 1+ | 5+ | 10+ | 25+ | 50+ |
|---|---|---|---|---|---|---|
| 404.020 | CF2 Double Sided | **3.99** | **3.89** | **3.75** | **3.65** | **3.45** |

## Unbranded 5¼" DS/DD from 80p

A double sided, double density unbranded floppy supplied in boxes of 10, with envelopes and write-protect tabs. Will operate on most single and double sided systems. Full replacement guarantee.

| Prices per box of 10 (excl VAT) | | 1+ | 5+ | 10+ | 25+ | 50+ | 100+ |
|---|---|---|---|---|---|---|---|
| 400.001 | DS/DD 48 tpi | **9.90** | **9.20** | **8.90** | **8.60** | **8.30** | **8.00** |

## Printer Ribbons

| Prices each (excl VAT) | 1+ | 6+ | Prices each (excl VAT) | 1+ | 6+ |
|---|---|---|---|---|---|
| MT80 | **4.60** | **3.95** | Seikosha GP500 | **6.95** | **6.45** |
| MT110, 120, 160 | **5.75** | **4.85** | Epson 80 Series Black | **3.95** | **3.60** |
| MT130, 140, 180 | **5.75** | **4.85** | Epson 80 Series Red | **4.80** | **4.30** |
| Ricoh 1300/1600 M/S Black | **3.10** | **2.85** | Epson 80 Series Blue | **4.80** | **4.30** |
| Ricoh 1300/1600 M/S Brown | **3.40** | **3.15** | Epson 80 Series Brown | **4.80** | **4.30** |
| Ricoh 1300/1600 M/S Blue | **3.40** | **3.15** | Epson 100 Series Black | **5.05** | **4.60** |
| OKI M80, 82A, 83A, 92, 93, Blk | **1.95** | **1.75** | CBM 801 | **6.95** | **6.45** |
| OKI M80, 82A, 83A, 92, 93, Red | **2.60** | **2.25** | CBM 8023 | **3.60** | **3.15** |
| OKI M80 etc Brown | **2.60** | **2.25** | CBM 1515, 1525 | **3.75** | **3.10** |
| OKI M80 etc Green | **2.60** | **2.25** | Brother HR15, HR25, (corr) | **4.15** | **3.85** |
| OKI M80 etc Blue | **2.60** | **2.25** | Brother HR15, HR25 (m/s) | **5.45** | **5.05** |
| OKI M84 | **3.60** | **3.10** | IDS 480 (Microprism) | **5.55** | **5.15** |
| Canon PW 1080 | **6.95** | **6.45** | Shinwa CP80 | **4.60** | **3.95** |
| Juki 6100 M/S | **3.75** | **3.55** | CBM 4023 | **4.60** | **3.95** |
| Seikosha GP100 | **3.95** | **3.60** | Taxan Kaga | **6.95** | **6.45** |

1. All prices include 2nd Class delivery (U.K. mainland) but exclude VAT. For urgent deliveries or outside U.K. mainland, please telephone for delivery charges.
2. Telephone orders can be accepted from Government bodies, schools, etc., or with a VISA card.
3. Send cheque made payable to "IDS Computer Supplies", with order to the address below.

# IDS Computer Supplies

**15 Darin Court, Crown Hill, Milton**
**Keynes MK8 0AD. (0908) 569655**

VISA

# Power up Santa's grotto with a stepping motor

### By MIKE COOK

**FOLLOWING the article I wrote about interfacing stepping motors – Body Building, May 1984 – I have had many requests to follow it up with one about the technique of controlling small DC motors. So here we go.**

If you take a look at the date on the cover you will see that Christmas is on its way. The high street stores will be planning their animated models of Dickensian characters for Santa's grotto. These models need controlling as well as making and a computer is the ideal device to generate complex and changing sequences.

The great advantage of stepping motors is the fine and precise control which can be achieved with a computer. However this is not without cost. The main disadvantage of stepping motors is the low speed and limited torque of the cheaper motors. I know you can get high-speed, powerful stepping motors, but these do tend to be heavy and expensive.

DC motors on the other hand offer a good "power to weight" ratio and are reasonably priced. They come in many different sizes and there should be one to suit any application you have in mind.

As the running speed of DC motors is too fast for many applications, a wide range of gear boxes is available which can be used to tailor the speed. These gear boxes can either be bolted on or may be integral to the motor housing. The main advantage of using a gear box to reduce the speed is that the torque of the motor increases as the speed is reduced. Another means of controlling speed is to use electronics, as we shall see later.

In essence, controlling a motor with a computer is no different from controlling any other binary device. You need a logic output which will switch a motor.

We looked at control in the Body Building, August 1983 article and saw how we could switch a device on and off with software. To recap briefly, one line of the user port is used and is manipulated by software. To avoid changing the state of any other user port line we use the logic operators AND (to clear a line to logic 0) and OR (to set it to logic 1).

For example, suppose the line we wished to change was line 3, we would write one in the third bit of a byte (8 bits) in order to create a mask. (Remember that the lowest bit is labelled zero.) The mask to set that bit is therefore &0B. So to turn a device on simply execute:

```
?&FE60 = ?&FE60 OR &08
```

To clear the line the mask needs to be inverted. That is, we must write a 0 in the line bit position and ones everywhere else. Thus the mask is &F7, so to clear our line we use:

```
?&FE60 = ?&FE60 AND &F7
```

For a more detailed explanation of what is going on please refer to the earlier article.

The circuit in Figure I shows the simplest control arrangement. When the user port line is high, current flows through the base of the transistor, turning it on and starting the motor. As the transistor is current driven, the motor supply is not limited to the 5 volts of the computer supply.

The majority of motors run off 12 volts and this is easily handled with most transistors. Note however that the zero volt line of the motor supply and the zero volt (or earth) line of the computer have to be connected together or "commonned". This is something that beginners often neglect to do.

The only other component is the diode which is there to soak up any back EMF. As the motor is inductive a reverse voltage (or back EMF) is generated every time it is turned off, the

→

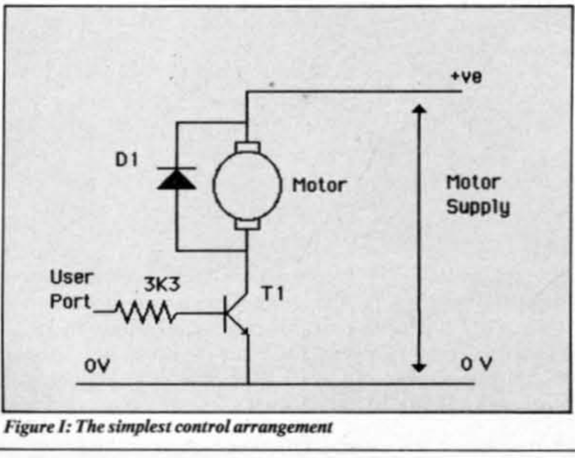


*Figure I: The simplest control arrangement*

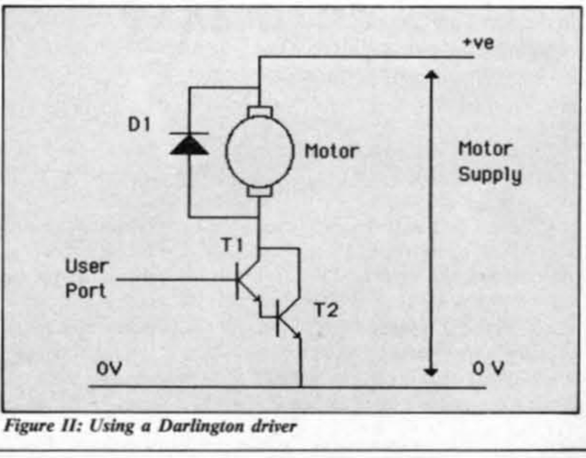


*Figure II: Using a Darlington driver*

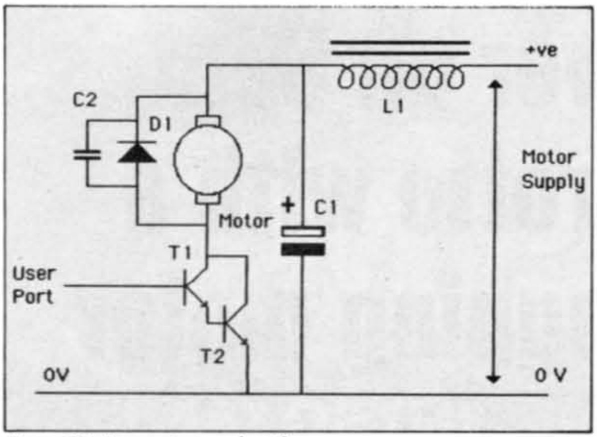


*Figure III: Suppressing supply spikes*

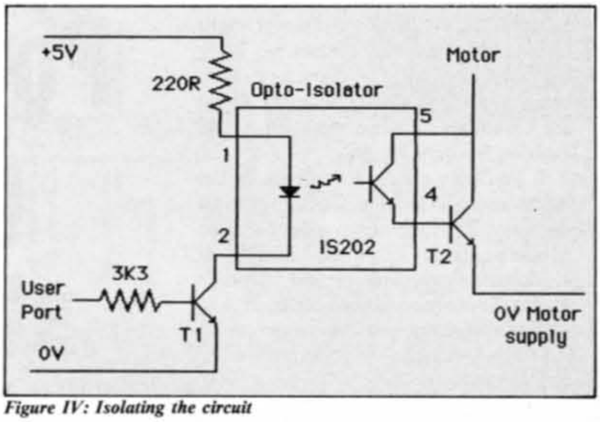


*Figure IV: Isolating the circuit*

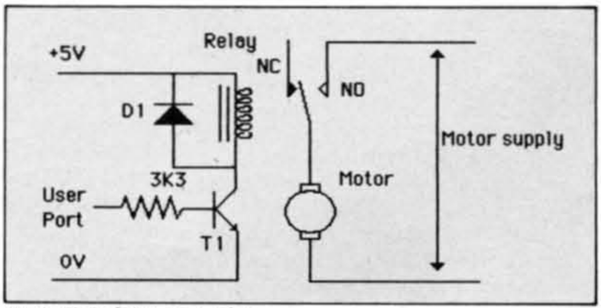


*Figure V: Isolation via a relay*

*From Page 143*

diode conducts and shorts out this voltage to prevent it doing any harm.

Well if it were as simple as that there would be no need for an entire article about it.

The first complication comes with the fact that power transistors do not usually have a high gain. This can be solved by using two transistors in a Darlington driver or super alpha pair as shown in Figure II. This arrangement of connecting two transistors essentially leaves you with a three terminal device which can be treated like a transistor, except that the gain is the product of the two individual transistors. As alpha was the name originally given to a transistor's gain, we get super alpha pair as a name.

If you make T1 a low current high gain transistor and T2 a power transistor you can switch larger loads. Note that you can also dispense with the resistor, as the two base junctions drop about 1.4 volts across them and the VIA on the user port can stand having a logic one dragged down to this voltage.

In practice motors are often noisy devices, not only acoustically but also electrically. One form of electrical noise is induction spikes on the supply lines. The effect of these can be to produce transitory logic ones on the microprocessor's bus and hence corrupt the instruction being received. This causes the computer to crash.

I have always thought "a computer crash" is too dramatic to describe what actually happens – I prefer to call it a "sulk". The only known remedy for a sulking computer is the Break key and most likely it will sulk again when the motor is switched on. The solution is to isolate the supply to the motor from that to the computer and try to suppress the noise.

Figure III shows the standard method of supply suppression. C1 is a large electrolytic capacitor used to smooth out supply variations. C2 is a small ceramic capacitor to short out high frequency noise from the motor and L1 is a choke.

A choke is simply an inductor which can be made by winding a length of wire round a resistor. Inductors have a high impedence to high frequency signals so rapid spikes do not get through. However they have a low impedance to DC and pass that to the motor.

With certain noisy motors this suppression will not be sufficient as there is always that common connection of the earth line between motor and computer. In order to totally isolate the two supplies we need another device. Total isolation may be achieved electrically with an opto-isolator as shown in Figure IV.

Here the computer turns on a light emitting diode which is coupled with a light sensitive transistor. As light is making the connection, the need for a common earth between the motor and computer is eliminated.

There are opto-isolators which can be driven directly from the output of the user port but they are quite expensive and so the best arrangement is to use a driving transistor as illustrated.

Another way to isolate the motor is by using a mechanical relay as shown in Figure V. D1 is required to soak up the back EMF of the relay coil which can be driven from the 5 volt supply available from the user port socket. A relay will usually have two contacts, one of which is normally closed (NC) and the other, normally open (NO). Here "normally" refers to the un-energised state of the relay.

It can be useful to have these contacts as we can arrange for a logic 1 or 0 at the user port to turn our motor on. This is important because, whenever you press the Break key, the VIA is initialised so that all its lines become inputs and all inputs act like logic ones. Therefore, if you arrange for a motor to come on with a logic one it will also come on when the Break key is pressed.

Now relays can have more than one set of contacts and we can use a two pole (two sets of contacts) to make the motor change direction. All you need do to make a motor reverse is to reverse the direction of current flowing through it. This is shown in Figure VI. Note that the motor will always be on but you can control this with another relay.

Figure VII shows two single pole relays which control both the direction and state of the motor. This circuit has a great advantage which is not immediately apparent: If the two relays are in the same state, the motor is, in effect, shorted out. This produces regenerative braking when the motor is turned off.

You see, when a running motor is turned off, it does not immediately stop: the inertia in the motor keeps it spinning. A spinning motor acts as a generator and starts to produce electricity, but this electricity is of the opposite polarity needed to drive the motor in its original direction. So, if we feed the electricity generated by the motor back into the motor, it will try and drive it in the opposite direction. The net result is that the motor stops very quickly. I think you can work out why the motor will not actually go backwards.

So the circuit in Figure VII not only provides directional control but also has a built-in regenerative brake.

What about controlling the speed of a motor? Well one technique is to vary the voltage supply. However, this doesn't give you very good control at low speeds. Computer control would be tricky because you would need a digital to analogue (D/A) converter and a high current applifier. Not only that but you would eat up many lines on the user port for the D/A converter.

The electronic solution is to use a chopper! Consider Figure VIII. The waveform shown in A spends most of its time at zero volts and occasionally pulses up to 5 volts. Therefore, on average, there is not much drive in it. On the other hand waveform B spends most of its time at 5 volts and so there is a lot more power in it.

If these waveforms are used to drive a DC motor then the speed is proportional to the length of time the waveform spends at the positive supply. By changing the pulse width supplied to a motor we can change its speed. Note that the speed of the pulses is not important, only the length of time they spend high and low. (In fact the speed of the waveform must be faster than the

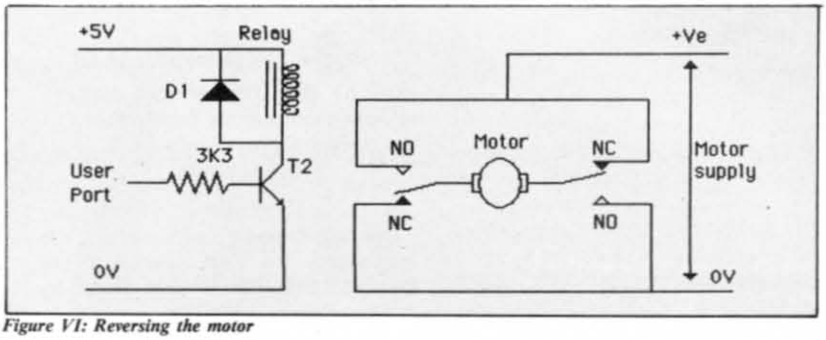

+5V
Relay
D1
3K3
T2
User Port
0V
+Ve
NO
Motor
NC
NC
NO
Motor supply
0V

*Figure VI: Reversing the motor*

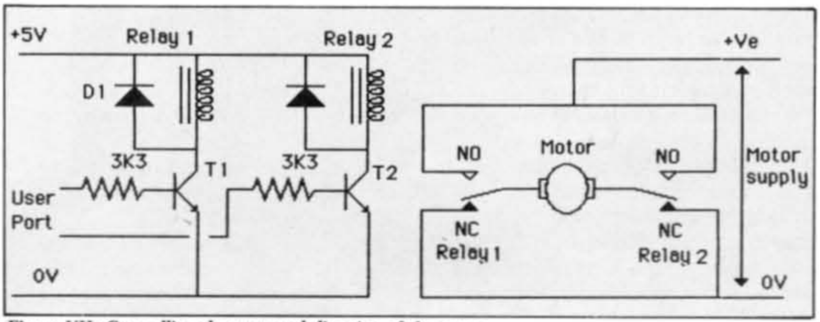

+5V
Relay 1
Relay 2
D1
3K3
T1
3K3
T2
User Port
0V
+Ve
NO
Motor
NO
NC Relay 1
NC Relay 2
Motor supply
0V

*Figure VII: Controlling the state and direction of the motor*

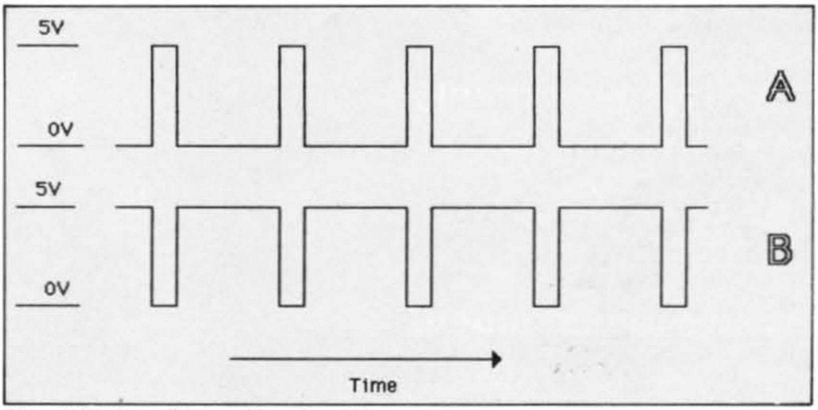


*Figure VIII: Controlling speed by pulse width*

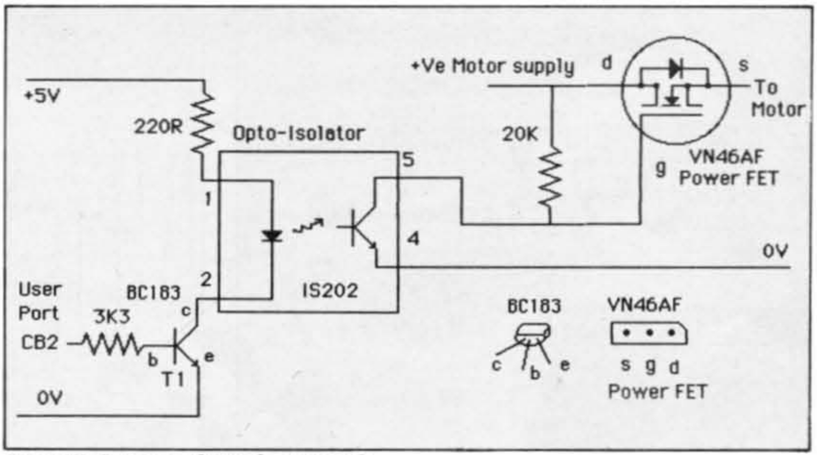

+5V
220R
Opto-Isolator
1
2
5
4
IS202
+Ve Motor supply
d
s
To Motor
20K
g
VN46AF Power FET
0V
User Port CB2
3K3
BC183
c
b
e
T1
0V
BC183
c
b
e
VN46AF
s g d
Power FET

*Figure IX: Creating a choppped power supply*

rom Page 145

otor speed to get smooth running.)

One way of getting this "chopped ıpply" to the motor is shown in Figure X. This uses a power FET to switch the upply rapidly in response to the omputer's control. The power FET hown is capable of driving up to 3 amps ınd so several motors can be powered vith it providing you don't want them to un simultaneously at different speeds.

I have shown this being driven from an opto-isolator, but it could be driven straight from a transistor if required. This arrangement also has a logic 0 supplying power to the motor.

We can use many methods to drive it but perhaps the simplest is to use the VIA's shift register running in mode 4. In this mode the shift register is clocked out at the speed determined by timer 2. Also, it is a recirculating shift register which means that, after the 8 bits have been clocked out once, they are automatically clocked out again. The result is that, once set up, the pulses are produced automatically and need no processor intervention.

Figure X shows three different values placed into the shift register and the resultant output on CB2. Remember that logic zero turns the motor on. Depending on the bit pattern placed in the shift register the motor can be fully on (place 0 in the shift register) fully off (place &FF in the shift register) or one of seven intermediate speeds.

The instructions to achieve this are quite simple:

```
?&FE6B = (?&FE6B AND &E3) OR &10
```

sets the shift register into mode 4 without changing any other settings of the register. Then:

```
?&FE68 = &7F
```

sets the speed of timer 2. Virtually any value will do but if the number is too small the motor might not run at low speeds, due to the rise time caused by the inductive windings.

Finally, to change the speed at any time access the shift register with:

```
?&FE6A = &XX
```

where XX can be 0, &1, &3, &7, &F, &1F, &3F, &7F, &FF depending on the speed you want.

These instructions can of course be part of a program as well as being typed straight from the keyboard.

Finally we come to something that DC motors are not so good at: the fine control of movement. With a stepping motor it is simple, a fixed number of pulses producing a precise amount of movement.

With a DC motor you can try to control it by turning it on for a fixed time and calibrating the movement, but this will not work very well. What you really need is some form of feedback. A sensor which tells the computer how far the motor has moved.

The technique used on the Edinburgh Turtle and other applications features in Figure XI. This shows an optical switch monitoring the movement with a slotted disc. The software has to count the pulses produced and that is a measure of how far the motor has turned. This is rather like a stepping motor in reverse.

Alternatively any model shop will have a range of model servo-motors which are a geared DC motor with a potentiometer attached to the shaft. This can be read by the analogue input port to feed-back the shaft position. They are designed to receive pulses from a controller but they can be easily opened and rewired so as to access the

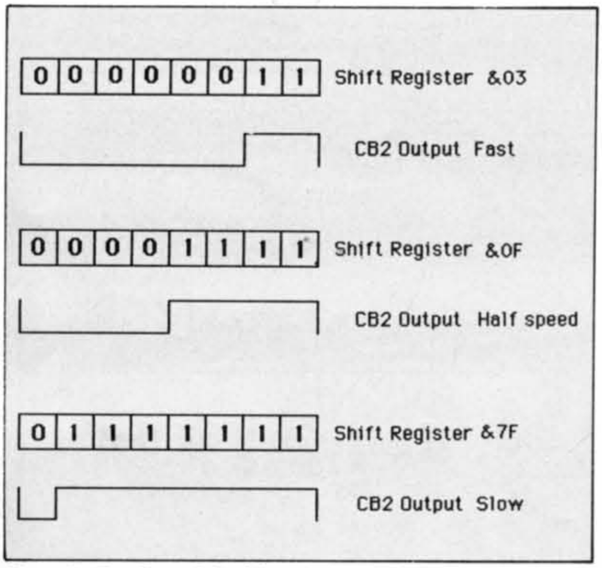


*Figure X: The effects of the shift register on CB2*

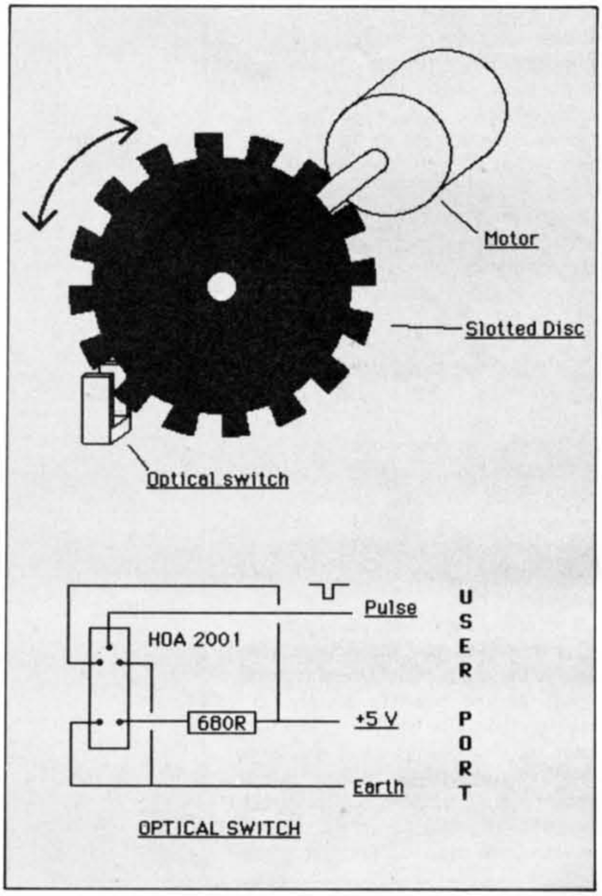


*Figure XI: Monitoring movement via an optical switch*

> *'What you really need is some form of feedback'*

motor and feedback pot.

Most computer control will be of the step type. That is, the control algorithm will be *keep on going until you reach where you need to be*. This can produce overshoot and a condition known as hunting. There are many complex mathematical formlas describing the workings of feedback servo-mechanisms to get a correctly damped system. However you can approximate to these by arranging for the motor to slow down when it is close to its final position.

Well that's a brief tour of motor control. Let's look at what's on offer this month. As many people's requirements will be different, I have tried to offer as many different packages as possible. However please note that individual components cannot be supplied. For full prices see the order form on Page 174. The motors on offer all work off 12 volts and draw between 165 to 230 mA depending upon the loading.

The motors with separate gearboxes need the drive cog fitting on with super glue. They are very quiet and start quickly. They have a basic torque of 5mNm (milli Newton meters) with a starting torque of 30mNm. (Remember the torque is increased with reducing gears.) The basic speed is 3,000 RPM and you can work out the gear ratio from this.

The motors with integral gear boxes also have a built-in spark suppressor and represent a good, general-purpose motor. The control packs have all the components necessary to build some of the circuits shown here.

Finally, if you haven't already got them, you will need Pack 1 (the transition board) and Pack 2 (the connecting cable) to access the lines on the user port, or some cheaper equivalent arrangement.

So there you have it: All the parts to make your own buggy or the animated marvel of Santa's grotto or whatever you want. The possibilities are limited only by your own imagination. Now where have I heard that before?

THOUGHTWARE by **QUAL-SOFT** Experts in sports simulations

**WEMBLEY 1966**

**ENGLAND 4 WEST GERMANY 2**

In 1966 Alf Ramsey proved that English club soccer players, with intelligent management, could not only dominate European club football, but could take on, and beat the rest of the world at International level. Could you do the same in . . . .

**TAPE 1 QUALIFIERS**

**MEXICO '86**

**TAPE 2 FINALS**

**A WORLD CUP MANAGEMENT SIMULATION**

Summer 1984 and English International football is at its lowest ebb. We have failed to qualify for the European Nations Cup, and had a string of very poor International results. In a few months we will set out on the '86 World Cup qualifying trail. You have been given the most important job of restoring English pride in their football. You have a match in Paris, the USSR at Wembley, and a South American tour, to assemble a team, first to qualify, and then to beat the world's best in Mexico.

**TAPE 1 (Qualifiers)**

- ★ Current squad of 16 players + 20 user defined players.
- ★ Friendlies in Paris, at Wembley + South American tour.
- ★ ANY team formation you choose. 2 from 5 substitutes.
- ★ In match tactics: any no. of individual player adjustments.
- ★ Your qualification group: full results and table.

**TAPE 2 (Finals)**

- ★ Choose a 20 man squad to take to the finals.
- ★ Group of 4 prelims. 16 to final knockout comp.
- ★ Extra Time, PENALTY SHOOT-OUTS, where relevant.
- ★ Formation and strength information on opposition.
- ★ 2 from 9 substitutes (the FA tells us so).

**ENGLAND'S GAMES: FULL PITCH, 22 MAN, 3D GRAPHICS & SOUND EFFECTS**

QUAL-SOFT comments: With 5 levels of play, 12 depths of sophistication, and "fun" graphics, this game can be enjoyed by an 8 year old youngster as a "fun" game, and by the most sophisticated as a tactical/strategy challenge of the highest order.

**PRICE & SUPPLY: Tape1 + Tape2 + 20 page book + p&p ONLY £9.95. ACCESS 'phone orders 1/2 days, orders by 1st class post 3/4.**

**QUAL-SOFT,**
**Dept. EU,**
**18 Hazelmere Rd.,**
**Stevenage, Herts SG2 8RX.**
**Tel: 0438 721936**

Please supply:
MEXICO '86
Electron ☐
BBC 'B' ☐

Name: ..........................................................
Address: ......................................................
......................................................................
Access No. (if applicable) ..................................

## CHUKEE* THE UPGRADE

By S.D. Ellington **From BIT TWIDDLERS**

If your ALREADY OWN the popular game of Chuckie Egg then CHUKEE will provide:

1. **3 Speeds**
2. **8 New Screens**
3. **Select Start Level (1-41)**
4. **Variable Extended Jump**
5. **Design Your Own Screens!!!**

YES, after you have mastered the original screens and our screens, you can edit the data statements in the main program (CHUCK1) and design your very own.
Creative and Educational – A & F Approved.
The renowned KILLA and MONSTAS Upgrades still available.
**£3.25** each. Two on one cassette **£5.00**. All three on one cassette **£7.00**. State BBC or ELECTRON.

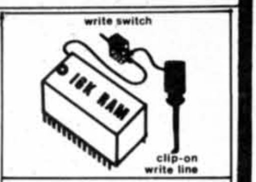
**BIT TWIDDLERS**
Dept. MU11, 158 Church End, Harlow, Essex CM19 5PF.

*Chuckie Egg is the trademark of A & F Software.

---

## 16K & 32K RAM modules

- Plugs into any ROM socket (inc BBC+)
- No soldering required
- Write protect switch that fits neatly to the back of BBC case
- Modules can be fitted side by side
- Store your ROMs on disc/tape
- Listings supplied to save existing ROMs and to load RAM module
- Low power static RAM



**Note:** The 32k version consists of two 16k modules sharing the same write switch. This obviously requires two spare sideways ROM sockets.

**16K RAM module £22**
**32K RAM module £42**

FREE P&P – Send cheques/PO to: **C.F. Terrell,**
**7B Essex Gardens, Hornchurch,**
**Essex RM11 3EH**

**S.A.E. FOR QUANTITY DISCOUNT**

---

## AMSTRAD IN EDUCATION

- Latest Amstrad computer models.
- Substantial discount and education software.
- 1 year free hardware service contract.
- £200 education software pack (supplied FREE)
- Amstrad BBC Basic (Z80) language pack.
- Amstrad hard disc system.
- Amstrad local Area network system (for Amstrad, BBC, Apple, Apricot, IBM systems).

Further details for educational establishments.
Contact the Amstrad Educational Distributors:

**NORTHERN COMPUTERS LTD.**
**Churchfield Road, Frodsham, Cheshire WA6 6RD.**
**Tel: (0928) 35700.**
**Telex: 265871 (MONREF G) Quote: (UK) 84:CXX123**

---

## AHOY!

**SAILING SIMULATOR FOR THE BBC MICRO 32K**

**FULL FEATURE SIMULATION WITH SOUND AND MODE 1 GRAPHICS**

Race your yacht against the clock around a triangular course, negotiating shipping lanes, shallows and rocky channels. Develop your sailing skills in this four level simulation, which includes variable wind speed and direction, variable currents, and true to life compass and co-ordinate instrumentation.

Suitable for teaching sailing and navigation to beginners, as well as being fun for the experienced.

**Tape £7.50 inc. Postage**

**Available from:**

**S. HOYLE**
**35 Fore Street, Newquay, Cornwall TR7 1HD**

**A WORLD FIRST ON ANY MICRO**

---

## BEEB BODY BUILDING PACKS ORDER FORM

**Pack 1** Transition Board £9.95 ☐
**Pack 2** Ribbon Cable & sockets £9.95 ☐
**Pack 28a** Precision motor with separate gearbox @ £32.00
Please select gearbox to give final speed of: 360 RPM ☐
250 RPM ☐
120 RPM ☐
60 RPM ☐
25 RPM ☐
12 RPM ☐
**Pack 28b** Geared Motor @ £14.00
Select speed of: 330 RPM ☐
60 RPM ☐
**Pack 28c** Control pack 1 £4.50 ☐
Components to make Fig VII
2 Miniature relays, 2 diodes, 2 transistors, 2 resistors.
**Pack 28c** Control pack 2 £8.00 ☐
Components to make Fig IX and Fig XI
Opto isolator, optical slow switch, power FET, transistor and 4 resistors.

TOTAL____

All prices include postage and VAT.
Overseas orders add £4.00 if you want airmail delivery.

Please make cheques payable to Musbury Consultants and send to Musbury Consultants, 8 Fairhill, Helmshore, Rossendale, Lancs BB4 4JX.

Name ______________________________

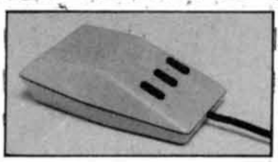
Address ______________________________

______________________________

---

## MEGAMOUSE

CAD
DESIGN
GRAPHICS



ART
DRAWING
EDUCATION

Superior British mouse with optical encoding and rubber coated ball which is quiet, non slip and accurate

★ ***Advanced CADMOUSE disc software*** ★

*"Best drawing package seen on BBC"* – Tubelink

MODE 0
Maximum
Resolution

MODE 1
Real Time
Colour

Compact Icons – Large drawing area
ABUNDANCE of CAD, Colour art, drawing facilities

★ ***POWERFUL MANIPULATIVE ROUTINES*** ★

Move Objects! Duplicate! Mirror Image!

*(AMX Compatible)*

*"Best balance between quality of S/W and mouse L/W"* – P.C.W.

**WIGMORE HOUSE LTD**
**32 SAVILLE ROW**
**LONDON W1X 1AG**
**01-734 0172**

ACCESS
CHEQUES
P.O.

**MEGAMOUSE + CADMOUSE**
**£89.60 (£103.04 inc VAT)**
**P&P (£1.50)**

# Now you see it, now you don't

## Disable your paged ROM with this utility from RICHARD BEESTON

**HAVE you ever wanted to disable a paged ROM in your BBC Micro because one of its star commands exists in another ROM? Well here's a program that will allow you to do just that.**

When an operating system command – prefixed with a star – is not recognised by the OS it is passed to the paged ROMs and then to the current filing system.

The command is first offered to the ROM in socket &F then to ROM &E, &D and so on. If no ROM recognises the command the OS passes it to the currently active filing system, such as the DFS.

If you have two ROMs which have the same command(s) – say in sockets &C and &2 – the one in socket &C will always be offered the command before ROM &2. This is because socket &C has the higher priority.

To get round this problem you can either remove the ROM or disable it.

This program allows you to deactivate any ROM and ensure, if you wish, that the ROM stays deactivated even after Break is pressed. You can, therefore, use any of the * commands available in ROM &2 without removing ROM &C. If you want to use the routines in ROM &C you can reactivate the ROM and it will accept commands as usual.

When the BBC Micro is turned on, and after Break, the OS checks each paged ROM socket and builds up a table of the ROMs present in locations &2A1 to &2B0. A zero in location &2A1 + N shows there is no ROM in socket N.

For instance, to turn off ROM &C all you have to do is put a zero in location &2A1+&C (&2AD). If you now do a *HELP you will see that the ROM is no longer present.

To turn off ROM number N – where N is in the range 0 to &F – you must put zero in location &2A1 + N and press Break. The ROM will now return because the OS builds a new table.

This program allows you to put a zero in locations &2A1 to &2B0 by pressing the keys 0 to 9 and A to F – corresponding to the ROM socket numbers. For instance, pressing C will toggle ROM &C on and off.

If a ROM is on when key N is pressed the program copies the value from location &2A1 + N to location &90 + N and then puts a zero in location &2A1 + N to disable it. Thereby the ROM is turned off and the ROM type is saved for putting the ROM back on again.

If the ROM is off the program copies the value from location &90 + N to location &2A1 + N and puts a zero in location &90 + N. Thereby the ROM is turned on again.

When you are satisfied with each ROMs status press Return. You will now be asked if the ROMs are to be reactivated on Break. If you press Y the ROMs you turned off are reactivated on Break. If you press N the ROMs that you turned off will not be reactivated on Break or even Ctrl+Break.

To reactivate the ROMs you can either turn your BBC Micro off and then on again, or you can re-run the program and toggle the ROMs back on again. Alternatively, you could disable the Break intercept routine with *FX 247,0, which puts a zero into location &287.

The Break intercept code is used to control the ROMs which are turned off when Break is pressed. Disabling the routine with *FX 247,0 allows the OS to generate the ROM table in its usual way.

The routine is assembled at &6FED, but is executed from location &7000. This is because of a short routine just before the main section which is responsible for copying the Break intercept code to &A80.

Changing to any mode other than 7 will destroy the program at &7000. Once the relevant ROMs have been deactivated you won't need the routine, so it will be safe to use any screen mode.

You can relocate the code by changing the value of *P%* in line 140 to the address you require minus &13. Lines 2330 and 2340 should also be changed so that the correct start address is printed once the program is assembled.

If a DFS is present and you disable it Page will be set to &E00 when Break is pressed, thus changing your BBC Micro into a tape-based system.

It is interesting to see that many software houses have given their star commands prefixes to avoid clashes with other ROMs. But the problem is that they're all using Z for the prefix!

### MEMORY USAGE

| | |
|---|---|
| &90-&9F | Copy of the ROM table. |
| &F6 | Address pointer into a paged ROM. |
| &287-&289 | The Break intercept code which consists of a jump (JMP - &4C) followed by an address – low byte then high. This is called when the Break key is pressed. |
| &2A1-&2B0 | OS paged ROM table. |
| &380-&383 | Temporary workspace. |
| &A80-&AA0 | Code executed on Break. |

### Disabler listing

```
  10 REM  Now you see it,
  20 REM  now you don't.
  30 REM  (c) The Micro User
  40 REM
  50 REM  By R Beeston
  60 REM
  70 MODE7:PRINT''''''" Assembling .
.........."
  80 OSWRCH=&FFEE
  90 OSBYTE=&FFF4
 100 OSRDRM=&FFB9
 110 OSNEWL=&FFE7
 120 OSRDCH=&FFE0
 130 FORX%=0TO2STEP2
 140 P%=&6FED
 150 [OPTX%
 160 .START
 170            LDA #&00
 180            STA &39F
```

→

*From Page 149*

```
190          LDX #&00
200 .LLOP    LDA BREAK,X
210          STA &A80,X
220          INX
230          CPX #EBREAK-BREAK
240          BNE LLOP
250          RTS
260 .ROMS
270 .OK1     LDA &39F
280          AND #1
290          CMP #0
300          BNE OK3
310          LDA #0
320          LDX #0
330 .LOOP10  STA &90,X
340          INX
350          CPX #&10
360          BNE LOOP10
370 .OK3
380          LDX #&00
390 .LOOP5   LDA TITLEROM,X
400          BEQ OK2
410          JSR OSWRCH
420          INX
430          BNE LOOP5
440          RTS
450 .OK2     LDY #&00
460          LDX #&00
470          LDA #48
480 .LOOP6   JSR OSWRCH
490          STA &380
500          LDA #&20
510          JSR OSWRCH
520          TYA
530          TAX
540          LDA &90,X
550          BEQ NOROM2
560          STX &383
570          LDX #&00
580 .LOOP11  LDA ROMOFF,X
590          BEQ FFIN
600          JSR OSWRCH
610          INX
620          BNE LOOP11
630 .ROMOFF:]:PROCstr("Off "+CHR$&0
0):[OPT X%
640 .ROMON:]:PROCstr("On  "+CHR$&00
):[OPT X%
650 .NOROM2
660          LDA &2A1,X
670          BEQ NOROM
680          STX &383
690          LDX #&00
700 .LOOP12  LDA ROMON,X
710          BEQ FFIN
720          JSR OSWRCH
730          INX
740          BNE LOOP12
750 .FFIN
760          LDX &383
770          LDA #&80
780          STA &F7
790          LDA #&09
800          STA &F6
810 .LOOP7   STY &381
820          JSR OSRDRM
830          LDY &381
840          CMP #&0D
850          BEQ LAST
860          CMP #&00
870          BEQ LAST
880          CMP #31
890          BCS OK13
900          LDA #&20
910 .OK13
920          JSR OSWRCH
930          INC &F6
940          JMP LOOP7
950 .LAST    JSR OSNEWL
960          INC &380
970          INY
980          INX
990          LDA &380
1000         CMP #71
1010         BEQ INP
1020         CMP #58
1030         BEQ LOOP14
1040         JMP LOOP6
1050 .LOOP14
1060         LDA #65
1070         JMP LOOP6
1080 .SOCKETEMPTY:]:PROCstr("    Soc
ket empty."+CHR$&0D+CHR$&00):[ OPT X%
1090 .NOROM
1100         STX &382
1110         LDX #&00
1120 .LOOP8  LDA SOCKETEMPTY,X
1130         BEQ LASTY
1140         JSR OSWRCH
1150         INX
1160         JMP LOOP8
1170 .LASTY  LDX &382
1180         JMP LAST
1190 .INSTRUCTION:]:PROCstr(CHR$&0A+
CHR$130+"Which rom do you want to tog
gle ?"+CHR$&0D+CHR$&0A+CHR$130+"
  Return to finish."+CHR$&0A+CHR$&0D
+CHR$&00):[OPT X%
1200 .INP
1210         LDX #&00
1220 .LOOP9  LDA INSTRUCTION,X
1230         BEQ INP2
1240         JSR OSWRCH
1250         INX
1260         JMP LOOP9
1270 .INP2
1280         JSR OSRDCH
1290         BCC OK4
1300         RTS
1310 .TITLEROM:]:PROCstr(CHR$&0F+CHR
$132+CHR$157+CHR$141+CHR$131+"
Roms in your machine.         "+CHR$13
2+CHR$157+CHR$141+CHR$131+"        Rom
s in your machine.        "+CHR$&0A+C
HR$&0A+CHR$&0A+CHR$&0D+CHR$&00):[OPT
X%
1320 .OK4
1330         CMP #&0D
1340         BNE OK5
1350         LDA #&00
1360         JMP YN
1370 .OK5
1380         CMP #48
1390         BCS OK6
1400         JMP INP2
1410 .OK6    CMP #71
1420         BCC OK7
1430         JMP INP2
1440 .OK7    CMP #58
1450         BCC OK8
1460         CMP #65
1470         BCS OK9
1480         JMP INP2
1490 .OK8
1500         SEC
1510         SBC #48
1520 .STORE  TAX
1530         LDA &2A1,X
1540         BEQ OK11
1550         STA &90,X
1560         LDA #&00
1570         STA &2A1,X
1580         JMP OK3
1590 .OK11
1600         LDA &90,X
1610         STA &2A1,X
1620         LDA #&00
1630         STA &90,X
1640         JMP OK3
1650 .OK9
1660         SEC
1670         SBC #55
1680         JMP STORE
1690 .YN
1700         LDA #1
1710         STA &39F
1720         LDX #&00
1730 .LOOP13 LDA RE,X
1740         BEQ DON
1750         JSR OSWRCH
1760         INX
1770         BNE LOOP13
```

```
1780 .DON       JSR OSRDCH
1790            BCC OK12
1800            LDA #&00
1810            RTS
1820 .OK12      CMP #89
1830            BEQ Y
1840            CMP #78
1850            BEQ N
1860            JMP DON
1870 .Y         LDA &39F
1880            AND #1
1890            STA &39F
1900            LDA #&00
1910            STA &287
1920            RTS
1930 .N         LDA &39F
1940            AND #2
1950            BEQ OK14
1960            LDA #&00
1970            JMP BRKVECT
1980 .OK14      LDA &39F
1990            CLC
2000            ADC #2
2010            STA &39F
2020            LDA #&00
 2030           JMP BRKVECT
 2040 .RE:]:B$=CHR$10+CHR$10+CHR$10+C
HR$10+CHR$10+CHR$10+CHR$10+CHR$10+CHR
$10+CHR$10+CHR$10+CHR$129+" Reactivat
e on break  (Y/N) ?"+CHR$10+CHR$10+CH
R$10+CHR$10+CHR$10+CHR$10+CHR$10+CHR$
10+CHR$10+CHR$10+CHR$10+CHR$10+CHR$10
+CHR$&0D+CHR$&00
 2050 PROCstr(B$):[ OPT X%
 2060 .BRKVECT  LDA #&4C
 2070           STA &287
 2080           LDA #&80
 2090           STA &288
 2100           LDA #&A
 2110           STA &289
 2120           LDA #&0
 2130           RTS
 2140 .BREAK    BCC CONTINUE
 2150           RTS
 2160 .CONTINUE LDX #&00
 2170 .LOOP15   LDA &90,X
 2180           BNE ROFF
 2190 .FRED     INX
 2200           CPX #&10
 2210           BNE LOOP15
 2220           LDA #&3
 2230           STA &39F
 2240           RTS
 2250 .ROFF     LDA #&00
 2260           STA &2A1,X
 2270           LDA #&00
 2280           BEQ FRED
 2290 .EBREAK
 2300 ]
 2310 NEXT
 2320 CALL START
 2330 PRINT'''"To run type 'CALL &700
0'"'"Or press f0."'''
 2340 *KEY 0 CALL &7000|M
 2350 END
 2360 REM
 2370 DEFPROCstr(A$)
 2380 $P%=A$:P%=P%+(LEN(A$))
 2390 ENDPROC
```

*This listing is included in this month's cassette tape offer. See order form on Page 199.*

# SURPLUS PRINTER SALE

**BRAND NEW PRINTERS FROM TOP MANUFACTURERS AT A FRACTION OF LIST PRICE!**

**PROFESSIONAL MATRIX PRINTER**

- High definition 9x11 Matrix
- Full emulation of Epson MX80
- 100 ch/sec bi-directional printing
- Tractor or single sheet feed
- RS232 and centronics interfaces
- Full graphics capability
- Expanded & condensed print
- Comprehensive self-test
- Many other extra features
- Ideal for business micro systems
- Comprehensive manual

£149 plus VAT and £11.50 p/p

£69 plus VAT and £5.75 p/p

**PERSONAL COMPUTER PRINTER**

- Fast quiet thermal printing 56 ch/sec
- Full 8½in wide paper
- Full 80 column text
- Standard 8-bit ASCII 96 character set
- Standard RS232 interface
- Expanded or condensed print
- Built-in self-test
- Free 80 foot roll of paper
- Ideal for any micro with RS232
- Full instructions included

**VIDEO MONITOR SALE**

Brand new high resolution video monitors, green screen, in attractive case. Ideal for any micro with composite video out.

9 inch **£44** 12inch **£54**

Add VAT and £12.50 carriage

**SURPLUS EQUIPMENT SALE**

We have a huge stock of surplus micro systems, printers, terminals, power supplies, and much more. Send SAE for current list.

Example: Brand New
STC Prestel terminals **£99** plus VAT!

**CHILTERN ELECTRONICS**

Europe's No 1 Dealer in DEC PDP11 and VAX Computer Systems and spares.

HIGH STREET, CHALFONT ST. GILES, BUCKINGHAMSHIRE HP8 4QH TELEPHONE: 02407 71234

Telephone or send your order to **Tim Reading** We accept personal cheques or telephone your Access card No.

All items despatched within 24 hours

**AT PL** **Advanced Technology Products Limited**

**B.U.5.**
**Station Road, Clowne,**
**Chesterfield, S43 4AB.**
☎ **(0246) 811585 (4 lines)**

## SIDEWISE

No.1 MARKET LEADER

**SIDEWISE, ROM/RAM EXPANSION FOR THE BBC MICRO**

- ★ Full Sideways ROM Expansion to a total of 16 ROMS.
- ★ 16K Battery Backed CMOS RAM Option - Ram is treated as ROM no 15 on read.
- ★ Software for Sideways ROMS may be down loaded and run in RAM under true Sideways environment. See below for details of software packages available.
- ★ An ideal tool for Sideways ROM program development with the addition of RAM.
- ★ Plug-in-and go construction mounts neatly inside the BBC.
- ★ No soldering required to fit Sidewise.
- ★ Full buffering of address and data busses - prevents data bus loading problems associated with unbuffered boards.

Join the 10's of thousands of happy users.

**£38.00** + £1.00 P&P + VAT

**OPTIONS FOR SIDEWISE**

Battery back up kit

**£17.00** + 50p P&P + VAT

CMOS RAM 8K Bytes

**£5.50** + 50p P&P + VAT

**Buy 2 for £10.00** + 50p P&P + VAT

## SIDEWISE PLUS

**The Sideways ROM Board for the new BBC B+ Computer**

- ★ Full Sideways expansion to a total of 10 x 16K ROMS.
- ★ Mounts neatly over the Sideways area inside BBC+ Micro.
- ★ No soldering required to fit Sidewise Plus.
- ★ Fully buffered board.

**£29.95** + £1.00 P&P + VAT

## SOFTWARE PACKAGES

**A range of software specifically designed to enhance and extend the use of Sideways RAM on ATPL Sidewise and other products.**

★ **SPOOLIT** Allows the Sideways RAM to be used as a 8K or 16K printer buffer.

**£10.00** + 50p P&P + VAT

★ **DFS SHIFT** Moves the user RAM workspace required by the DFS into Sideways RAM. Allows memory recovery to & 0E00. Works with Acorn .9DFS only.

**£10.00** + 50p P&P + VAT

★ **SIDESWIPE** Allows you to save Sideways ROM onto disc and load Sideways ROMS from disc into RAM.

**£10.00** + 50p P&P + VAT

★ **TURBOPROM - 1** Uses a fast programming algorithm to greatly reduce programming time of EPROMS (14 mins = 2 mins), used in conjunction with Autoprom (BBC and other systems).

**£10.00** + 50p P&P + VAT

★ **TURBOPROM - 2**
As TURBOPROM 1 but the program comes in a Sideways ROM.

**£15.00** + 50p P&P + VAT

★ **DISC INDEX PROGRAM**
Allows you to generate a data base of disc directories stored on Sideways CMOS RAM (Compatable with Acorn DFS only).

**£10.00** + 50p P&P + VAT

### ★ INDEX UTILITY ROM

**Index Utility has been written to help utilize the ATPL SIDEWISE board to its fullest extent.**

**Features supported include:**

- ★ Paged ROM/RAM control.
- ★ Memory eraser.
- ★ Disc utilities.

plus many more, including features to make the use of a 6502 Second Processor less tiresome.

Command examples are:

- ★ Disc free space per drive.
- ★ Dump text window to printer.
- ★ Erase; Memory in specified area, ROM control switch and tube memory.
- ★ Display low memory areas.
- ★ Load menu.
- ★ Switch NFS off.
- ★ Manipulate read/write on ROM 15.
- ★ ROM display.
- ★ ROM switch on/off copy.
- ★ Search facilities.

As can be seen from just a few of the many commands this ROM is a useful addition to the SIDEWISE ROM board.

**FOR ONLY £24.95** + 50p P&P + VAT

## INSIDEOUT

**INSIDEOUT is designed to make a sideways ROM socket available outside the BBC computer, to allow for easy exchange of sideways ROM's.**

- ★ Can be used from BBC model B or expansion board sockets
- ★ Supplied with low insertion force socket for ease of use no costly cartridge packing.
- ★ EPROM plug in and go.
- ★ Not limited to one device.
- ★ Socket rated at 100's of insertions mounted outside the BBC. Easily removed and refitted.
- ★ Can be mounted in user defined location — not fitting in an illegal position.

**ONLY £13.00** + 50p P&P + VAT

**DEALERS ENQUIRIES WELCOME ON ALL OUR PRODUCTS –PLEASE CALL**

## WE OFFER A DESIGN DEVELOPMENT AND MANUFACTURING SERVICE

## SYMPHONY

The Acorn Music 500 Compatable Electronic Keyboard. The Symphony Electronic Keyboard provides simulation of a wide range of musical instruments and sound effects through the BBC Micro or the Acorn Music 500.

**£105.70** + £3.50 P&P + VAT

**OPTIONAL EXTRAS**

**SYMKIT**-Allows sound output from the BBC to be connected to an external amplifier.

**£5.89** + 50p P&P + VAT

**SYMAMP**-Wooden cased amplifier with 6 Watt output suitable for use with the Symphony keyboard or Acorn Music 500.

**£39.50** + £2.50 P&P + VAT

**SYMSWITCH**-Sustain foot switch for use with the Symphony keyboard.

**£6.95** + £1.00 P&P + VAT

**SYM 500**-Software to allow music to be played through Acorn Music 500 via the Symphony keyboard - Now includes sequencing.

**£14.95** + 50p P&P + VAT

Demonstrations of Symphony can now be seen at the following places.
Technomatic, 15-17 Burnley Road, London NW10 1ED.
Electronequip, 59 West Street, Fareham, Hampshire CO16 0JW.
The Data Store, Chatterton Road, Bromley, Kent.
Cardiff Micro, 46 Charles Street, Cardiff CF1 1EE.

## COLOUR-STICK

**An advanced light pen package for the BBC Computer, with disc based art program, Icon driven.**

- ★ Comprehensive manual and software including two games, Solitaire and Pontoon.
- ★ Drawing facilities include; Multi point rubber banding, 4 colour shapes for circles, squares, rectangles, elipses, arcs, and sectors at any angle and size.
- ★ Drag drawing, and air brush facilities with unique area washing.
- ★ Colour fill in any of 4 solid colours and a choice from 120 textured colours.
- ★ Screen printer dumps to Epson printer.
- ★ Utilities to provide users with light pen routines.
- ★ Fits to analogue port and needs 40 or 80 track disc drive.
- ★ Text can be entered in various sizes, fonts and colours.
- ★ Save and load screens to and from disc.
- ★ Please state 40 or 80 track disc.

**£39.50** + £1.00 P&P + VAT

## CAD SYSTEM

**Robo systems professional CAD for Apple, BBC, and IBM Computers**

- ★ 10,000 users worldwide, rapidly becoming the standard CAD System at a realistic price.
- ★ Auto dimensioning adjustable curves, precision grids and angle locks, powerful zoom and pan, scale drawing and text, and graphics library index.
- ★ Supports a wide variety of plotters from A4 to A0.
- ★ Ideal tool for:- Electrical/electronic engineers, chemical engineers, planning engineers, architects, education establishments, and PCB design.

ATPL have been appointed distributors for Robo products. We are currently looking for dealers, very attractive discounts available, please apply.

CAD systems start at **£795**

Please contact sales office for demonstration or quotation

## BREAK LOCK

**EVER HIT YOUR 'BREAK' KEY WHEN YOU DIDN'T MEAN TO?**

### FOR THE BBC MICRO

Fit ATPL 'BREAK LOCK' to your BBC Micro and avoid disaster where inadvertant use of 'BREAK' will cause loss of data and/or programmes.

ATPL 'BREAK LOCK' is a 2 position key-switch that will:

- ★ Prevent accidental or unauthorised use of the 'BREAK' key.
- ★ Act as a security device to prevent unauthorised use of your system more effectively and cheaper than security ROMs.
- ★ Easily and neatly fit in the 'Ash-tray'.
- ★ Render demonstration machines tamper-proof.

**£8.53** + 50p P&P + VAT

## AUTOPROM

**Professional EPROM Programmer for the BBC computer and Acorn type Systems.**

- ★ Capable of programming all 27 series EPROMS up to 27256 and most 25 series EPROMS.
- ★ Tape or disc based software, including fast program algorithm (27128 in 2 mins) and comprehensive manual.
- ★ Unique facility to run users own basic or machine code programs at Switch on or Reset.

**£98.00** + £2.00 P&P + VAT

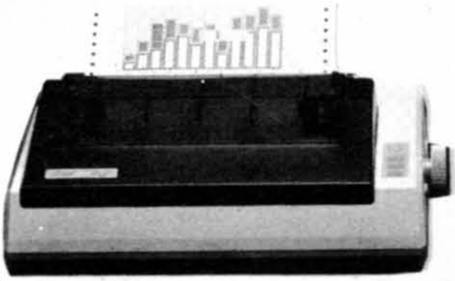
**CONDITIONS OF SALE & DELIVERY**

Cheques made payable to Advanced Technology Products Ltd.
Cost of carriage or postage refer to each section. Quantity orders and overseas carriage charged at cost. Condition of sales available on request.

VISA

ACCESS/VISA accepted. Carriage to be added to advertised price, then add VAT to the total. In accordance with our policy of progressive development, we reserve the right to modify specifications without prior notice.

# Yet another unbeatable deal from Datastar Systems!



## STAR SG10

**Character Sets**

- 96 Standard ASCII Characters
- 88 Standard International Characters
- 96 Italic Characters
- 88 Italic International Characters
- 96 NLQ Characters
- 88 NLQ International Characters

**Character Matrix**

Standard Characters: 9 dot × 11 dot
STAR Block Graphics: 6 dot × 6 dot
IBM Block Graphics: 12 dot × 11 dot
User Defined: 8 dot × 4 to 11 dot
Near Letter Quality: 17 dot × 11 dot

**Character Fonts**

Normal (10 CPI)
Elite (12 CPI)
Condensed (17 CPI)
NLQ (10 CPI)

**Line Spacing** 1/6, 1/8 in. or 7/72 in. Standard

**Dimensions (W × D × H)**
392 × 315 × 145mm (15.4 × 12.4 × 5.7 in.)

**Number of Columns**
80, 96, 136, (40, 48, 68 Double Width)

**Print Head** 9 Wires (User Replaceable)

### THE *INCREDIBLE* NEW STAR SG-10 NEAR LETTER QUALITY PRINTER.

*features:—*

- Epson and IBM compatible print codes
- Friction and tractor feeds.
- Externally Accessible DIP-Switches
- High-resolution bit-image graphics
- Downloadable character sets
- NLQ, italics, condensed, enlarged, super & subscript styles.
- High 120 CPS print speed, logic seeking.
- Hex dump facility.
- Macro-instructions.
- Touch-sensitive control panel.
- Standard parallel Centronics interface
- 2K print buffer — expandable to 10K

**SPECIAL OFFER TO BBC MICRO USERS**
**£30 off all in price of £297.85**
Just clip this advertisement to your order and send cheque for **£267.85**
Offer extended to 22nd November 1985

| | |
|---|---|
| **Star SG-10 £259 + VAT** | **£297.85** |
| **Parallel cable for any Micro (max. price)** | **£20** |
| **2 Spare ink ribbons** | **£5** |
| **2000 sheets of continuous listing paper** | **£15** |
| **Next day doorstep delivery service** | **£10** |
| | **£347.85** |

**Datastar's all in price £297.85!!!**

**Post your cheques to**

## Datastar Systems UK

**Unicom House, 182 Royal College Street, London NW1 9NN. Telex 295931 UNICOM G**

PERSONAL CALLERS WELCOME — We are situated by the junction of Camden Road, near the railway bridge
MONDAY-FRIDAY 9-6 SUNDAY 10-1 *EXPORT ENQUIRIES WELCOME*

## Credit Card Hot Line 01-482 1711

**AS MAIN DISTRIBUTORS FOR THE STAR RANGE, WE ARE ABLE TO OFFER EXCELLENT DEALER MARGINS**

*From Page 94*

```
10 :
20 REM ****************************
30 :
40 REM BASIC ANALYSER V.3 (Pt.1)
50 :
60 REM By Mike Stallybrass
70 REM
80 REM  (C) The Micro User
90 :
100 REM ****************************
110 :
120 ON ERROR : ON ERROR OFF : PRINT TAB(0,15) : REPORT : PRINT " at line "; ERL : CLOSE #0 : STOP
130 MODE7 : VDU23,1,0;0;0;0; : M%=HIMEM : HIMEM=TOP+&800 : Q%=HIMEM : R%=Q%+256 : F%=R%+13
140 FOR S%=0 TO 248 STEP 4 : S%!Q%=0 : NEXT : Q%!236=-1 : Q%!252=2
150 DIM B% 256 : A%=0 : D%=0 : G%=&FFFF : H%=&FFFF0000 : K%=&10000 : V%=0 : W%=0 : @%=&607
160 FOR J%=1 TO 2 : PRINT CHR$129 CHR$157 CHR$141 CHR$135 TAB(10) "B A S I C   Analyser" : NEXT : PRINT ' CHR$133+"Program ":
170 INPUT pgm$ : $R%=LEFT$(pgm$,12) : E%=OPENIN $R%
180 IF E%=0 : PROCer("Unable to find file") : ELSE IF EOF #E% : PROCer("No data in file")
190 C%=BGET #E% : IF C%<>13 : PROCer("Requested File not BASIC")
200 PRINT TAB(9,3) CHR$134 $R% ' CHR$133 "First line for analysis "; : INPUT y% : IF y%<1 : y%=0
210 PRINT TAB(25,4); CHR$134 y% 'CHR$133 "Last line "; : INPUT x% : IF x%<1 : x%=&7FFF
220 PRINT TAB(11,5); CHR$134 x% '' CHR$133 "Current Line" CHR$131 TAB(23) CHR$133 "Pgm length" CHR$131 "&"'' CHR$133 "Lines analysed" CHR$134 TAB(23) CHR$133 "Statements" CHR$134
230 PRINT CHR$133 "Variables found" CHR$134 TAB(23) CHR$133 "References" CHR$134 ' CHR$133 "Workspace used  " CHR$134 "&" TAB(23) CHR$133 "Space free" CHR$134 "&"
240 :
250 REPEAT : IF FNline : P%=0 : I%=0 : PROC@c : IF NOT FNend : REPEAT : PROCstmt : UNTIL FNend
260 UNTIL N%<0
270 GOTO 2900
280 :
290 DEF FNline
300 IF D% : Q%!248=Q%!248+D% : D%=0
310 C%=BGET#E% : IF C%>127 : CLOSE#E% : N%=-1 : =0
320 N%=256*C%+BGET#E% : L%=BGET#E%-4 : IF L%<1 : PROCer("Invalid line length")
330 FOR J%=0 TO L% : J%?B%=BGET#E% : NEXT
340 IF L%?B%=13 : Q%!252=Q%!252+L%+4 : C%=?B% : ELSE PROCer("Missing end of line")
350 PRINT TAB(18,7); N% TAB(18,9) Q%!244 TAB(35,9) Q%!248 TAB(18,10) V% TAB(35,10) W% TAB(36,7) ~Q%!252 TAB(19,11) F%-Q% TAB(36,11) M%-F% " " TAB(0,13) CHR$129 CHR$157
360 b%=0 : IF N%>=y% AND N%<=x% : b%=1 : Q%!240=N% : Q%!244=Q%!244+1 : IF Q%!236<0 : Q%!236=N%
370 =b%
380 :
390 DEF FNend : IF P%>=L% : =TRUE : ELSE IF I%>1 : IF C%=&8B : PROC_ELSE : =FNend
400 IF C%=58 : REPEAT : PROC@ : UNTIL C%<>58 : ELSE IF I%>0 : PROCsyntax("Missing : ") : =FNend
410 D%=D%+1 : IF P%>=L% : =TRUE : ELSE IF I%=1 : =FALSE : ELSE IF I%=2 : IF C%=&8B : PROC_ELSE : =FNend
420 IF I%=0 : I%=1
430 =FALSE
440 :
450 DEF FNmore : PROC@
460 DEF FNmore0 : PROC@c
470 IF C%=58 OR C%=&8B OR P%>=L% : =FALSE : ELSE =TRUE
480 :
490 DEF PROCstmt
500 IF C%=91 : A%=1 : PROC@
510 IF A% : PROCass : ENDPROC
520 IF C%=42 : P%=L% : ENDPROC
530 IF C%=61 : PROC@ : T%=FNexp1(2) : ENDPROC
540 IF C%>&CE : PROCtoken : ENDPROC
550 T%=FNvar(128)
560 :
570 DEF PROC_LET : IF C%>&CE AND C%<&D4 : T%=FNsysvar : ELSE T%=FNvar(128)
580 IF C%=ASC"=" : PROC@ : ELSE PROCsyntax("Missing = in assignment") : ENDPROC
590 IF (T% OR FNexp1(0))<10 : ENDPROC : ELSE PROCsyntax("Mismatch of types in assignment") : ENDPROC
600 :
610 DEF FNexp0 : PROC@ : T%=FNexp1(U%) : PROC@c : IF C%=41 : PROC@ : =T% : ELSE PROCsyntax("Missing )") : =-1
620 :
630 DEF FNexp1(U%) : T%=FNexp2 : IF C%=&80 OR C%=&82 OR C%=&84 : PROC@ : T%=T% OR FNexp1(U%)
640 IF T%<10 : =T% : ELSE PROCsyntax("Mismatch of types in expression") : =-1
650 :
660 DEF FNexp2 : T%=FNexp3 : IF C%<60 OR C%>62 : =T%
670 PROC@i : IF C%=61 OR C%=62 : PROC@ : ELSE PROC@c
680 IF (T% OR FNexp3)<10 : =2 : ELSE PROCsyntax("Mismatch of types in comparison") : =-1
690 :
700 DEF FNexp3 : T%=FNval(U%) : PROC@c : IF C%=42 OR C%=43 OR C%=45 OR C%=47 OR C%=94 OR C%=&81 OR C%=&83 : PROC@ : T%=T% OR FNexp3
710 =T%
720 :
730 DEF FNval(U%) : v%=-1 : PROC@c : IF C%=34 : =FNstring : ELSE IF C%=43 OR C%=45 : PROC@
740 IF C%=40 : =FNexp0 : ELSE IF C%>&8D AND C%<&C6 : =FNfn : ELSE IF C%=38 : =FNhex : ELSE IF C%=46 OR C%>47 AND C%<58 : =FNnum
750 :
760 DEF FNvar(U%)
770 PROC@c : IF C%=33 OR C%=63 : PROCind : =2 : ELSE IF C%=36 : PROCind : =8
780 n$=FNnam : IF C%=33 OR C%=63 : PROCind : IF T% AND 9 : PROCsyntax("Invalid first indirection operand")
790 PROCref : =T%
800 :
810 DEF FNnam : a$="" : IF C%<64 OR C%>90 AND C%<95 OR C%>122 : PROCsyntax("Variable name missing") : S%=0 : T%=-1 : ="*"
820 REPEAT : a$=a$+CHR$C% : PROC@i : UNTIL C%<48 OR C%>57 AND C%<65 OR C%>90 AND C%<95 OR C%>122
830 IF C%=36 : a$=a$+"$" : PROC@i : T%=8 : ELSE IF C%=37 : a$=a$+"%" : PROC@i : T%=2 : ELSE T%=4
840 IF C%=40 : q$=FNargs(U% OR 32) : a$=a$+q$ : T%=T%+1 : IF INSTR(q$,"$") : PROCsyntax("Illegal array subscript")
850 S%=4*(ASCa$-63) : IF S%>108 : S%=S%-16 : ELSE IF MID$(a$,2)="%" : S%=4 : ELSE IF S%=4 : PROCsyntax("Inval
```

**Datapen**

## TURBOBALL

### Now add "go faster" goodies to your TRAK-BALL

The ATARI TRAK-BALL has a superb resolution when used with the BBC Micro's user port, but, in common with all trackerball and mouse devices, is slow when moving from one side of the screen to the other. With menu driven programs this can be annoying, but now with TURBOBALL you can zap at incredible speed to anywhere on the screen, while still retaining the same resolution when required.
TURBOBALL also provides two extra button switches making the ATARI TRAK-BALL compatible with other 3 switch mouse and trackerball devices. In addition we have provided X HOLD and Y HOLD buttons which make vertical and horizontal alignment a dream.

- Two auxiliary switches
- X and Y freeze facility
- Fully adjustable "fast" speed
- Special deal on SPLASH! art program
- Simple clip fitting – no alteration to your TRAK-BALL

## SPLASH!

### Superb art drawing program for the BBC Micro

Especially commissioned from Tecnation for the launch of our TURBOBALL interface, this Super-fast machine code program is packed with all the features you need to produce arty Mode 2 screen dumps that you can be really proud of. The on-screen menu makes it easy for even a pre-school child to get excellent pictures, yet the combination of commands available allow you to generate amazing results with no effort at all. Some of the "trick" GCOL effects just have to be seen to be believed.
Although intended for computer artistry this program contains enough geometric and "technical" drawing commands to make it a SPLASH! with every type of user.

- Fully screen menu driven
- Trackerball operation
- Circles, ellipses, triangles, rectangles, etc.
- Brush and line thickness control
- Fast machine code program, a joy to use
- Fast solid and pattern filling routines
- Rotating pattern menu
- "Trick" colour effects available on all commands
- Superb multicolour text effects
- Spray paint, solid or patterned
- Full 16 colour operation

**TURBOBALL Interface £29.95**

TURBOBALL
aux a
x hold
fast
y hold
aux b

**ATARI TRACK-BALL £19.95**

**SPLASH! £13.95**
*(on disc only, specify 40T or 80T)*

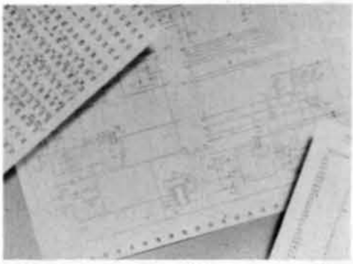
*Please note the **ATARI TRAK-BALL** will not run from the BBC Micro without an interface. We also sell a simple interface at £13.00, which is suitable for use with our **CIRKWIK** Schematic Drawing Program, but not with **SPLASH!***

**SPECIAL OFFER**
ATARI TRAK-BALL
TURBOBALL INTERFACE
SPLASH! software
all 3 for **£56.00** (inc VAT)

## CIRKWIK

## Schematic drawing on the

# BBC micro



A lightpen or trackerball driven CAD package orientated to the production of schematic drawings, such as circuit diagrams, flow charts, power systems, pipework diagrams, fluid logic diagrams and many similar engineering applications.

- Lightpen or trackerball driven
- Virtual screen 8x the BBC's mode 4
- Uses standard dot matrix printer in dual-density graphics mode to produce excellent quality diagrams
- Automatic parts list generation
- Up to 640 different symbols may be in use in any one drawing
- Total symbol library unlimited in size
- Create your own symbols on a highly magnified scale
- Many electronic symbols already included in the package

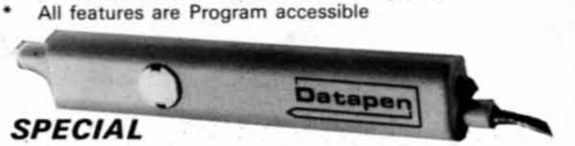
***Please send your cheque/P.O./Access No. to:***

**Dept. MU2 Datapen Microtechnology Ltd,**
**Kingsclere Road, Overton,**
**Hants. RG25 3JB. Tel: (0256 770488)**
*SAE FOR FURTHER DETAILS*

## A QUALITY LIGHT PEN

### SUPERIOR PERFORMANCE

- Absolutely insensitive to ambient lighting.
- Responds to different colours and screen intensities without adjustment of TV or monitor.
- Red LED readout showing that data is available.
- Switch for program control (allows pen to approach the screen without erroneous data capture)
- All features are Program accessible



## *SPECIAL CHRISTMAS OFFER!*

**BEEBPEN drawing program FREE with lightpen**

**Lightpen and Beebpen software only £25.00**

**PRICES**

| | |
|---|---|
| SPLASH! | *disc* **£13.95** |
| CIRKWIK lightpen only | *disc* **£19.95** |
| CIRKWIK trackerball/lightpen | *disc* **£24.95** |
| CIRKWIK Grafpad/lightpen | *disc* **£24.95** |
| **Lightpen software** | |
| DEFINE Sprite Animator/Editor | *disc* **£11.95** |
| DEFINE Sprite Animator/Editor | *cassette* **£9.95** |
| BEEBPEN Colour Drawing Program | *casetee* **£11.95** |
| TELETEXT Display Creator | *cassette* **£9.95** |
| **Hardware** | |
| DATAPEN Lightpen with BEEBPEN program | **£25.00** |
| MARCONI Trackerball (with Micro-Draw) | **£59.50** |
| MARCONI Trackerball (with ICON software) | **£69.50** |
| ATARI TRAK-BALL | **£19.95** |
| TURBOBALL Interface | **£29.95** |
| MOUSE/TRACKERBALL Interball | **£13.00** |

**ALL PRICES INC. VAT**

***Postage: Trackerball £2.50 Interface or software £1.00 MAX £2.50***

From Page 154

```
id @ in name")
  860 =a$
  870 :
  880 DEF PROCind : LOCALS%,T%,n$ : PROC@i : U%=U% OR 64 : IF FNval(U%)<8 : ENDPROC : ELSE PROCsyntax("Invalid indirection address") : ENDPROC
  890 :
  900 DEF FNfn : IF C%=&A4 : =FNfn_procnam(16) : ELSE IF C%>&8E AND C%<&94 : =FNsysvar
  910 IF C%=&9A OR C%=&A2 OR C%=&C5 : PROCchannel : =2
  920 IF C%=&9C OR C%=&9E OR C%=&9F OR C%=&A3 OR C%=&A5 OR C%=&AF OR C%=&B1 OR C%=&B9 OR C%=&BC : PROC@ : =2 : ELSE IF C%=&BE : PROC@ : =8
  930 U%=U% OR 16 : IF C%=&B3 : =FN_RND : ELSE IF C%=&B8 : =FN_TOP : ELSE IF C%=&BA : =FN_USR : ELSE IF C%=&C3 : =FN_STR
  940 LOCALt% : IF C%>&BCt%=8ELSE IF C%=&A0t%=0ELSE t%=2
  950 IF C%=&A7 OR C%=&B0 OR C%=&C0 OR C%=&C1 OR C%=&C2 OR C%=&C4 : q$=FNargs(U%) : ELSE PROC@ : T%=FNval(U%)
  960 =t%
  970 :
  980 DEF FN_RND : PROC@i : IF C%<>40 : PROC@c : =2 : ELSE IF FNval(U%)<8 : =2 : ELSE PROCsyntax("Invalid RND parameter") : =-1
  990 :
 1000 DEF FN_STR : PROC@ : IF C%=&7E : PROC@
 1010 IF FNval(U%)<8 : =8 : ELSE PROCsyntax("Invalid STR$ parameter") : =-1
 1020 :
 1030 DEF FN_TOP : PROC@i : IF C%=80 : PROC@ : =2 : ELSE PROCsyntax("TO in error") : =-1
 1040 :
 1050 DEF FN_USR : PROC@ : IF FNval(14 OR U% AND 240)<8 : PROClineref(&70000 OR v% AND &FFFF) : =2 : ELSE PROCsyntax("Invalid USR call address") : =-1
 1060 :
 1070 DEF FNargs(U%) : LOCALS%,T%,a$,z$
 1080 z$="(" : REPEAT : PROC@i : IF U%=129 : T%=FNvar(U%) : ELSE T%=FNexpl(U%)
 1090 IF 8 AND T% : z$=z$+"$" : ELSE IF T% : z$=z$+"#" : ELSE z$=z$+"+"
 1100 PROC@c : IF C%=44 : z$=z$+","
 1110 UNTIL P%>=L% OR C%<>44 : IF C%=41 : PROC@ : ELSE PROCsyntax("Missing )")
 1120 =z$+")"
 1130 :
 1140 DEF FNfn_procnam(u%) : n$="" : IF C%=&A4 : S%=224 : ELSE S%=228
 1150 PROC@i : IF C%<48 OR C%>57 AND C%<64 OR C%>90 AND C%<95 OR C%>122 : PROCsyntax("FN/PROC name missing") : =-1
 1160 REPEAT : n$=n$+CHR$C% : PROC@i : UNTIL C%<48 OR C%>57 AND C%<64 OR C%>90 AND C%<95 OR C%>122 : PROC@c : IF C%=40 : n$=n$+FNargs(U% OR u%)
 1170 PROCref : =0
 1180 :
 1190 DEF FNsysvar : c%=C%-&8E : IF c%>5c%=c%-&40 : U%=&80
 1200 IF c%=1 : PROCchannel : n$="PTR#" : ELSE PROC@ : IF c%=2 : n$="PAGE" : ELSE IF c%=3 : n$="TIME" : ELSE IF c%=4 : n$="LOMEM" : ELSE n$="HIMEM"
 1210 S%=0 : PROCref : =2
 1220 :
 1230 DEF FNhex : h$="" : REPEAT : h$=h$+CHR$C% : PROC@i : UNTIL C%<48 OR C%>57 AND C%<65 OR C%>70 : PROC@c : v%=EVALh$ : =2
 1240 :
 1250 DEF FNnum : v%=VAL($(P%+B%)) : T%=2 : REPEAT : PROC@i : IF C%=46 : T%=4
 1260 UNTIL C%<46 OR C%=47 OR C%>57
 1270 IF C%<>69 : PROC@c : =T%
 1280 j%=P% : REPEAT : PROC@i : UNTIL C%<43 OR C%=45 OR C%=47 OR C%>57 : IF P%<>j%+1 : PROC@c : =4 : ELSE P%=j% : PROC@c : =T%
 1290 :
 1300 DEF FNstring : REPEAT : PROC@i : UNTIL C%=34 OR P%>=L%
 1310 IF P%>=L% : PROCsyntax("Missing """") : =-1
 1320 PROC@i : IF C%<>34 : PROC@c : =8 : ELSE =FNstring
 1330 :
 1340 DEF PROCass : IF C%=93 : A%=0 : I%=0 : PROC@ : ENDPROC
 1350 IF C%=46 : PROC@i : IF FNvar(142)>7 : PROCsyntax("Illegal assembler label") : ENDPROC
 1360 IF C%=58 OR P%>=L% : ENDPROC
 1370 IF C%=92 : REPEAT : PROC@i : UNTIL C%=58 OR P%>=L% : ENDPROC
 1380 REPEAT : PROC@i : UNTIL C%=58 OR C%=92 OR C%=32 OR P%>=L% : IF C%=58 OR P%>=L% : ENDPROC : ELSE IF C%=32 : T%=FNassv
 1390 IF FNmore@ : REPEAT : UNTIL NOT FNmore
 1400 ENDPROC
 1410 :
 1420 DEF FNassv : PROC@ : IF C%=40 OR C%=35 : PROC@
 1430 =FNexpl(15)
 1440 :
 1450 DEF PROCtoken
 1460 IF C%<&D4 : PROC_LET : ENDPROC
 1470 IF C%=&D5 : PROC_BPUT : ENDPROC
 1480 IF C%=&D6 : PROC_CALL : ENDPROC
 1490 IF C%=&D9 : PROCchannel : ENDPROC
 1500 IF C%=&DC : PROC_DATA : ENDPROC
 1510 IF C%=&DD : PROC_DEF : ENDPROC
 1520 IF C%=&DE : PROC_DIM : ENDPROC
 1530 IF C%=&E3 : PROC_FOR : ENDPROC
 1540 IF C%=&E4 : PROC@ : PROCgo(1) : ENDPROC
 1550 IF C%=&E5 : PROC@ : PROCgo(0) : ENDPROC
 1560 IF C%=&E7 : PROC_IF : ENDPROC
 1570 IF C%=&E8 : PROC_INPUT : ENDPROC
 1580 IF C%=&E9 : PROC@ : PROC_LET : ENDPROC
 1590 IF C%=&EA : PROCvlist(130) : ENDPROC
 1600 IF C%=&ED : PROC_NEXT : ENDPROC
 1610 IF C%=&EE : PROC_ON : ENDPROC
 1620 IF C%=&EF : PROC_VDU : ENDPROC
 1630 IF C%=&F1 : PROC_PRINT : ENDPROC
 1640 IF C%=&F2 : U%=1 : T%=FNfn_procnam(0) : ENDPROC
 1650 IF C%=&F3 : PROCvlist(139) : ENDPROC
 1660 IF C%=&F4 : P%=L% : ENDPROC
 1670 IF C%=&F5 : PROC_REPEAT : ENDPROC
 1680 IF C%=&F7 : PROC_RESTORE : ENDPROC
 1690 IF C%=&FC : PROC_TRACE : ENDPROC
 1700 IF C%=&FD : PROC_UNTIL : ENDPROC
 1710 IF C%=&D8 OR C%=&DA OR C%=&DB OR C%=&E0 OR C%=&E1 OR C%=&F5 OR C%=&F6 OR C%=&F8 OR C%=&F9 OR C%=&FA : PROC@ : ENDPROC
 1720 PROCparams(1) : ENDPROC
 1730 :
 1740 DEF PROC_BPUT : PROCchannel : IF C%<>44 : PROCsyntax("Missing ,") : ELSE PROC@ : IF FNval(10)>7 : PROCsyntax("Illegal BPUT parameter")
```

# GREAT NEWS!

# REVOLUTIONARY NEW PRODUCT.

## Fileaid extends BASIC data handling

FILEAID is a database system which is accessed via BASIC. It provides all the facilities required for complex data handling. FILEAID extends the capabilities of BASIC by providing fourteen new commands which allow you to create and access indexed files on diskette.

FILEAID gives you the ability to write sophisticated applications without worrying about the format data actually takes on the diskette. No matter what the application is, FILEAID will handle it.

One advantage of FILEAID is that you write your programs in BASIC, the language you already know, unlike other database systems.

What good is a database if you can't write your own programs to access it? BASIC is more flexible than any of the database languages.

The BASIC program may operate in any MODE and access as many files as required.

FILEAID is supplied as a EPROM, a diskette and a 77 page manual.

The EPROM contains the extra BASIC commands for accessing indexed files. The diskette contains five utilities for creating and maintaining your database system. The manual is a comprehensive guide to using FILEAID and contains an example of a telephone directory.

The program required for the telephone directory system is supplied on the utilities disc.

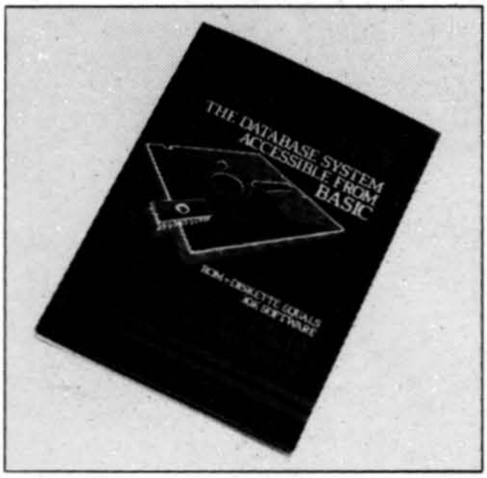
FILEAID is extremely easy to use yet very powerful. First tell FILEAID about the file using the file definition utility. Simply give it the names of the BASIC variables, their length and the maximum number of records that you want the file to hold. FILEAID then creates a file large enough for the definition you have described.

To write a record give the relevant command and FILEAID takes the contents of the appropriate variables and writes them to disc. When you read that record it returns the values to their BASIC variables. You can access the file randomly or sequentially and FILEAID takes care of the problem of keeping the index up-to-date.

FILEAID has been written so that it uses every bit of storage you can spare. The more storage available for FILEAID the faster it will work. It dynamically manages the available storage to optimize performance.

To give FILEAID more storage just set PAGE to a higher value. An EPROM command is available to help you do this.

- ● Record Fields may be Integer/Real/String
- ● Random Access Functions:- READ/INSERT/REPLACE/DELETE/REVERSE - DELETE
- ● Sequential Access Functions:- TOP/BOTTOM/READNEXT/READPREV
- ● Multiple Volume Support - Maximum 4 Drives
- ● Unlimited Number of Files per Program
- ● BACKUP/RESTORE Utilities
- ● Maximum Records per File 65,000 (depending on Disc Space)
- ● Maximum Record Size 4096 Bytes
- ● Maximum of 196 Fields (BASIC Variables) per Record
- ● File AUDIT/INFORMATION Functions
- ● Comprehensive 77 page Manual detailing Concepts/Facilities/Examples
- ● Free telephone/address directory system


THE DATABASE SYSTEM ACCESSIBLE FROM BASIC
ROM + DISKETTE EQUALS 40K SOFTWARE

YOU'LL LOVE THE CONCEPT!

**£35.00** PRICE INCLUDES P & P OVERSEAS ADD £3.00 P & P (AIR)

## Machine code graphics...NO PROBLEM!

AID
ASSEMBLER INTERACTIVE DEBUG
DUALSCREEN MONITOR ROM
LINCOLN Microsystems

This is not just another m/c monitor. AID offers features far in advance of other monitors.

One unique facility is it's ability to leave the program screen display unaffected when displaying AID information. Using this original DUALSCREEN concept m/c graphics programming becomes fun.

**£28.00** PRICE INCLUDES P & P OVERSEAS ADD £3.00 P & P (AIR)

"This dual screen feature is a cracker" Acorn User. March 1985.

**LINCOLN Microsystems**

P.O. BOX 74,
Bradford,
West Yorkshire. BD6 3RN

*From Page 156*

```
 1750 ENDPROC
 1760 :
 1770 DEF PROC_CALL : PROC@ : IF FNexpl(14)>7 : PROCsyntax("Invalid CALL address") : ENDPROC
 1780 PROClineref(&60000 OR v% AND &FFFF) : IF C%=44 : PROCvlist(11)
 1790 ENDPROC
 1800 :
 1810 DEF PROC_DATA : IF D%=1 : PROClineref(&3FFFF) : P%=L% : ENDPROC : ELSE PROCsyntax("DATA not at start of line") : ENDPROC
 1820 :
 1830 DEF PROC_DEF : IF D%<>1 : PROCsyntax("DEF not at start of line") : ENDPROC
 1840 PROC@ : IF C%<>&A4 AND C%<>&F2 : PROCsyntax("DEF not followed by FN or PROC") : ENDPROC
 1850 U%=129 : T%=FN_procnam(0) : I%=0
 1860 ENDPROC
 1870 :
 1880 DEF PROC_DIM : REPEAT : PROC@ : U%=131 : n$=FNnam : IF (T% AND 1) : PROCref : ELSE U%=132 : PROCref : IF FNexpl(164)>7 : PROCsyntax("Illegal byte array DIM")
 1890 UNTIL C%<>44 : ENDPROC
 1900 :
 1910 DEF PROC_ELSE : PROC@ : IF C%=&8D : PROCgo(1) : I%=1 : ELSE I%=0
 1920 ENDPROC
 1930 :
 1940 DEF PROC_ERROR : PROClineref(&4FFFF) : PROC@ : IF C%=&87 : PROC@ : ELSE I%=0
 1950 ENDPROC
 1960 :
 1970 DEF PROC_FOR : PROC@ : IF FNvar(133)>7 : PROCsyntax("Invalid FOR variable") : ENDPROC
 1980 IF C%<>ASC"=" : PROCsyntax("Missing =") : ENDPROC
 1990 PROC@ : IF FNexpl(5)>7 : PROCsyntax("Invalid FOR start value") : ENDPROC
 2000 IF C%<>&B8 : PROCsyntax("Missing TO") : ENDPROC
 2010 PROC@ : IF FNexpl(6)>7 : PROCsyntax("Invalid FOR end value") : ENDPROC
 2020 IF C%<>&88 : ENDPROC
 2030 PROC@ : IF FNexpl(7)<8 : ENDPROC : ELSE PROCsyntax("Invalid STEP value") : ENDPROC
 2040 :
 2050 DEF PROC_IF : I%=2 : PROC@ : IF FNexpl(3)>7 : PROCsyntax("IF - String expression invalid") : ENDPROC
 2060 IF C%=&8C : PROC@ : IF C%=&8D : PROCgo(0) : ELSE IF FNmore0 : PROCstmt
 2070 ENDPROC
 2080 :
 2090 DEF PROC_INPUT : PROC@ : IF C%=35 : PROCchannel0 : PROCvlist(138) : ENDPROC : ELSE IF C%=&86 : PROC@
 2100 U%=137 : IF FNmore0 : IF FNformat<>0 : REPEAT : T%=FNvar(U%) : UNTIL FNformat=0
 2110 ENDPROC
 2120 :
 2130 DEF PROC_NEXT : IF NOT FNmore : ENDPROC
 2140 REPEAT : IF C%=44 : REPEAT : PROC@ : UNTIL C%<>44
 2150 IF FNmore0 : IF FNvar(134)>7 : PROCsyntax("Invalid NEXT variable")
 2160 UNTIL C%<>44 : ENDPROC
 2170 :
 2180 DEF PROC_ON : PROC@ : IF C%=&85 : PROC_ERROR : ENDPROC
 2190 IF FNexpl(12)>7 : PROCsyntax("ON - String expression invalid") : ENDPROC
 2200 IF C%=&E4 : g%=1 : ELSE IF C%=&E5 : g%=0 : ELSE PROCsyntax("Missing GOTO/GOSUB after ON") : ENDPROC
 2210 REPEAT : PROC@ : PROCgo(g%) : UNTIL C%<>44
 2220 IF C%=&8B : PROC_ELSE
 2230 ENDPROC
 2240 :
 2250 DEF PROC_PRINT : PROC@ : IF C%=35 : PROCchannel0 : PROCparams(10) : ENDPROC
 2260 U%=9 : IF FNmore0 : IF FNformat<>0 : REPEAT : T%=FNexpl(U%) : UNTIL FNformat=0
 2270 ENDPROC
 2280 :
 2290 DEF PROC_REPEAT : IF FNmore : PROCstmt
 2300 ENDPROC
 2310 :
 2320 DEF PROC_RESTORE : IF FNmore : PROCgo(2) : ELSE PROClineref(&20000)
 2330 ENDPROC
 2340 :
 2350 DEF PROC_TRACE : PROC@ : IF C%=&87 OR C%=&EE : PROC@ : ELSE PROCgo(5)
 2360 ENDPROC
 2370 :
 2380 DEF PROC_UNTIL : PROC@ : IF FNexpl(4)>7 : PROCsyntax("UNTIL - String expression invalid")
 2390 ENDPROC
 2400 :
 2410 DEF PROC_VDU : w%=0 : REPEAT : IF C%=59 : w%=w%-1
 2420 v%=0 : IF NOT FNmore : w%=w%+1 : ELSE IF FNexpl(1)>7 : PROCsyntax("Invalid VDU argument")
 2430 IF w%>0 : w%=w%-1 : ELSE IF v%=1 OR v%=17 OR v%=22 : w%=1 : ELSE IF v%=18 OR v%=31 : w%=2 : ELSE IF v%=28 OR v%=29 : w%=4 : ELSE IF v%=19 OR v%=25 : w%=5 : ELSE IF v%=24 : w%=8 : ELSE IF v%=23 : w%=9
 2440 UNTIL P%>=L% OR C%<>44 AND C%<>59
 2450 IF w%>0 : PROCsyntax("VDU parameter may be missing")
 2460 ENDPROC
 2470 :
 2480 DEF PROCchannel : PROC@ : IF C%<>35 : PROCsyntax("Missing #") : ENDPROC
 2490 DEF PROCchannel0
 2500 PROC@ : IF FNval(8)<8 : ENDPROC : ELSE PROCsyntax("Illegal Channel-number") : ENDPROC
 2510 :
 2520 DEF FNformat : IF C%=&89 : PROC@ : T%=FNval(25) : =FNformat : ELSE IF C%=&8A : q$=FNargs(25) : =FNformat
 2530 IF C%=34 : T%=FNstring : =FNformat : ELSE IF C%=39 OR C%=44 OR C%=59 OR C%=126 AND U%=9 : PROC@ : =FNformat : ELSE =FNmore0
 2540 :
 2550 DEF PROCgo(g%) : IF C%=&8D : PROClineref(FNlineno+g%*K%) : ENDPROC : ELSE IF FNexpl(13)<8 : PROClineref(G%+g%*K%) : ENDPROC : ELSE PROCsyntax("Invalid line-number expression") : ENDPROC
 2560 DEF FNlineno : PROC@i : O%=(C% AND 48 EOR 16)*4+(C% AND 4 EOR4)*&1000 : PROC@i : O%=O%+(C% AND 63) : PROC@i : O%=O%+(C% AND 63)*256 : PROC@ : =O%
 2570 :
 2580 DEF PROCparams(U%) : REPEAT : PROC@ : T%=FNexpl(U%) : UNTIL P%>=L% OR C%<>44 : ENDPROC
 2590 DEF PROCvlist(U%) : REPEAT : PROC@ : T%=FNvar(U%) : UNTIL P%>=L% OR C%<>44 : ENDPROC
 2600 :
 2610 DEF PROC@ : REPEAT : P%=P%+1 : C%=P%?B% : UNTIL C%<>&20 : ENDPROC
 2620 DEF PROC@i : P%=P%+1 : C%=P%?B%
 : ENDPROC
 2630 DEF PROC@c : IF C%=&20 : PROC@
: ENDPROC : ELSE ENDPROC
 2640 :
 2650 DEF PROCsyntax(m$)
 2660 PRINT TAB(0,13) CHR$131 "Error
in line "; N% ", (statement " D% "),"
' CHR$131 "at offset " P% ", char=" C
% "(&" ~C% ") "; : IF C%>31 AND C%<12
8 : PRINT CHR$34 CHR$C% CHR$34 " :" :
 ELSE PRINT ":"
 2670 PRINT CHR$130 m$ ' : FOR J%=0 T
O L% : IF J%?B%>31 AND J%?B%<128 : PR
INT CHR$(J%?B%); : NEXT : ELSE PRINT
CHR$255; : NEXT
 2680 PRINT 'TAB(P%MOD40)"^" TAB(0,24
) CHR$129 "Press any key to continue"
 CHR$7 GET$ TAB(0,13) SPC240 SPC239;
 2690 IF I%=2 AND C%<>58 AND C%<>&8B
: REPEAT : PROC@ : UNTIL C%=58 OR C%=
&8B OR P%>=L% : ELSE IF C%<>58 : REPE
AT : PROC@ : UNTIL C%=58 OR P%>=L%
 2700 ENDPROC
 2710 :
 2720 DEF PROCe : PROCer("Out of spac
e")
 2730 DEF PROCer(m$) : PRINT TAB(0,15
) CHR$7 m$ : CLOSE#0 : STOP
 2740 :
 2750 DEF PROCref : PROC@c : IF F%+5>
M% : PROCe
 2760 Y%=0 : X%=Q%!S% : REPEAT : Z%=Y
% : Y%=X% : X%=!X% AND G% : IF Y%=0 :
 UNTIL TRUE : PROCadd : ENDPROC : ELS
E UNTIL $(Y%+5)>=n$ : IF $(Y%+5)<>n$
: PROCadd : ENDPROC
 2770 Y%=Y%+2 : X%=(!Y%) AND G% : !Y%
=F%+((!Y%) AND H%) : !F%=N%*K%+X% : F
%?4=U% : F%=F%+5 : W%=W%+1 : ENDPROC
 2780 :
 2790 DEF PROCadd : V%=V%+1 : W%=W%+1
 : IF F%+11+LENn$>M% : PROCe
 2800 IF Z%=0 : Q%!S%=F% : ELSE !Z%=F
%+(!Z% AND H%)
 2810 !F%=Y% : F%?4=T% : $(F%+5)=n$ :
 Y%=F%+2 : F%=F%+6+LENn$ : !Y%=F%+((!
Y%) AND H%) : !F%=N%*K% : F%?4=U% : F
%=F%+5 : ENDPROC
 2820 :
 2830 DEF PROClineref(O%) : IF F%+8>M
% : PROCe
 2840 Y%=0 : X%=Q%!232 : REPEAT : Z%=
Y% : Y%=X% : X%=!X% AND G% : IF Y%=0
: UNTIL TRUE : PROClineadd : ENDPROC
: ELSE UNTIL Y%!4)>=O% : IF Y%!4<>O% :
 PROClineadd : ENDPROC
 2850 Y%=Y%+2 : X%=(!Y%) AND G% : !Y%
=F%+((!Y%) AND H%) : !F%=N%*K%+X% : F
%=F%+4 : W%=W%+1 : ENDPROC
 2860 :
 2870 DEF PROClineadd : V%=V%+1 : W%=
W%+1 : IF Z%=0 : Q%!232=F% : ELSE !Z%
=F%+(!Z% AND H%)
 2880 !F%=Y% : F%!4=O% : Y%=F%+2 : F%
=F%+8 : !Y%=F%+((!Y%) AND H%) : !F%=N
%*K% : F%=F%+4 : ENDPROC
 2890 :
 2900 PRINT TAB(0,18) CHR$131"Reload
tape/disc with PART2 (if reqd)"'CHR$1
31"Press any key when ready" CHR$7 GE
T$ : CHAIN "Part2"
```

*This listing is included in this month's cassette tape offer. See order form on Page 199.*

STACK 100 PRODUCTS

NEW
£29·95
inclusive

FOR BBC MODEL B (OS 1.2)
- TRACKER BALL
- BALLPOINT COLOUR DRAWING SOFTWARE
- FREE X-WORD GAME
- FITS ANALOGUE PORT

A Full Colour potentiometric TRACKER BALL system with picture saving and loading. Box, Circle, Triangle, Line, Fill, Airbrush, Etc. – ACCURATE AND EASY TO USE. Challenging X-Word Game included. Cassette based – transferable to disk.

*ALSO AVAILABLE*

★ COLOUR LIGHTPEN + 10 games + LITEWRITER DRAW SOFTWARE **£28.00** **Inclusive**
★ GRAPHIX-ED Keyboard driven graphics generator program **£5.75** **Inclusive**

NOTE: LIGHTPEN and TRACKER BALL can use each others pictures

SPECIAL OFFER
40T DISKS
VERBATIM
- suit BBC **£11·93** PER 10
inclusive

**Available from good computer stores or direct from**
**MEEDMORE (DISTRIBUTION) LIMITED**
**28 Farriers Way Industrial Estate, Netherton,**
**Merseyside L30 4XL**
**Tel: 051-521 2202**
★ **P&P FREE**
**Cheques: Meedmore**

# Small Business Accounts & V.A.T. made Simple.

- **Invoicing, Accounts and V.A.T. made simple is the answer for your business**
- **Professional business software for the BBC'B' and BBC'B+'**
- **Over 1500 users on many computers, including over 250 on the BBC.**
- **Available for both twin 40 and twin 80 track disk drives.**

**Invoicing and Customer Accounts.**

- Three types of invoicing on plain or pre–printed paper
  - Standard
  - Descriptive
  - Period
- **Reports on Invoices and Customers Accounts including:–**
  - Customer Balances
  - Outstanding Invoices
  - Aged Debtors by Days
  - Label Printing
  - V.A.T. Reports
- **£100 plus V.A.T. on Sale or Return**

**Accounts and V.A.T.**

- No knowledge of book–keeping required to control your cash book or unpaid bills
- **Produces your V.A.T. return at the press of a button for:–**
  - Standard V.A.T. Scheme
  - Retail Special Schemes A to F
  - Pharmacy Scheme B
- **Trading, Profit and Loss Accounts at any time to help control your business**
- **£150 plus V.A.T. on Sale or Return**

**Buy Both and Save £50**

YES – Clip the Coupon now and we will rush you a copy 'Sale or Return' – you only pay if you decide to keep it. Or call and see it at your local dealer.

**Software made Simple**

Please return coupon to:
**Micro Simplex (Sales) Ltd., 8 Charlotte St. West, Macclesfield, Cheshire SK11 6EF**

Name ..............................................................

Company Address ..............................................................

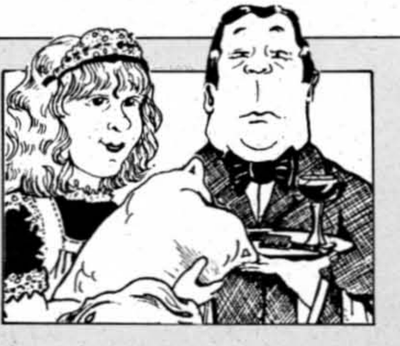
..............................................................

Telephone ..............................................................

Type of Business ..............................................................

*From Page 69*

```
  10 REM WHODUNNIT ?
  20 REM
  30 REM by KEN SMITH
  40 REM (c) The Micro User
  50 IFPAGE<>&E00GOTO4270
  60 MODE7
  70 ENVELOPE1,3,0,0,0,0,0,121,0,-10
,-5,-2,120,120
  80 VDU23;8202;0;0;0;
  90 DIM S$(9),W$(9),R$(9),S(9,9,3),
W(9,9,3),A(9),A$(52)
  100 j%=0:t%=0:D%=1:q%=0:m%=0:n%=0:P
%=RND(10)-1:S%=10^4
  110 c$="":h$=CHR$141:r$=CHR$129:g$=
CHR$130:y$=CHR$131:b$=CHR$132:m$=CHR$
133:n$=CHR$134:i$=CHR$135:f$=CHR$136
  120 PROCD(7,11,9,"WHODUNNIT ?")
  130 PROCI:TIME=0
  140 REPEAT
  150 IFS%<=0S%=0:PROCY:RUN
  160 PROCM:IFt%=RND(9-D%)PROCL
  170 UNTILFALSE
  180 DEFPROCM:PROCB
  190 CLS:PROCG:PROCD(7,1,2,"WHODUNNI
T ?"):PROCD(1,14,2,"Rank"+y$+D$)
  200 PRINTTAB(0,4)h$f$y$"What Next ?
";TAB(14,4);CHR$137;r$"Score"y$S%r$"
   Hi"y$H%;TAB(0,5)h$f$y$"What Next ?
";TAB(14,5);CHR$137;r$"Score"y$S%r$"
   Hi"y$H%
  210 L$=r$+STRING$(38,CHR$255)
  220 PRINTTAB(1,6);L$
  230 PROCD(3,0,7,"See the plan of th
e Manor..........<1>")
  240 PROCD(5,0,9,"Move to another ro
om...............<2>")
  250 A$="List current location of ":
PROCD(1,0,11,A$+"suspects..<3>")
  260 PROCD(6,0,13,A$+"weapons...<4>"
)
  270 A$="List past location of ":PRO
CD(2,0,15,A$+"suspects.....<5>")
  280 PROCD(3,0,17,A$+"weapons......<
6>")
  290 PROCD(5,0,19,"Change your detec
tive rank.........<7>")
  300 PROCD(6,0,21,"Pause/Quit the in
vestigation.......<8>")
  310 PRINTTAB(1,23);L$;
  320 *FX15,1
  330 REPEATB%=INSTR("12345678",GET$)
:UNTILB%
  340 ONB%GOTO350,360,370,450,460,540
,850,920
  350 PROCJ:ENDPROC
  360 PROCH:PROCS:ENDPROC
  370 CLS:m%=1:PROCD(2,0,0,"Current (
```



```
known) location of suspects."):PRINTT
AB(1,2)r$;STRING$(37,CHR$255)
  380 T%=3:FORC%=0TO9:FORB%=0TO9
  390 IFm%=1ANDS(B%,C%,3)=-1PROCD(5.0
,T%,R$(C%)):PROCD(3,18,T%,S$(B%)):T%=
T%+2
  400 IFn%=1ANDW(B%,C%,3)=-1PROCD(5,0
,T%,R$(C%)):PROCD(3,18,T%,W$(B%)):T%=
T%+2
  410 NEXT:NEXT
  420 IFT%=3PROCD(1,0,8,"No locations
 known at present."):PROCb
  430 PROCC
  440 m%=0:n%=0:ENDPROC
  450 CLS:n%=1:PROCD(2,0,0,"Current (
known) locations of weapons."):PRINTT
AB(1,2)r$;STRING$(37,CHR$255):GOTO380
  460 CLS:m%=1:PROCD(2,0,0,"Known loc
ation of suspects at the time"):PROCD
(2,0,2,"the murder occurred."+r$+STRI
NG$(17,CHR$255))
  470 T%=4:FORC%=0TO9:FORB%=0TO9
  480 IFm%=1ANDS(B%,C%,2)=-1ANDS(B%,C
%,0)<>0PROCD(5,0,T%,R$(C%)):PROCD(3,1
8,T%,S$(B%)):T%=T%+2
  490 IFn%=1ANDW(B%,C%,2)=-1ANDW(B%,C
%,0)<>0PROCD(5,0,T%,R$(C%)):PROCD(3,1
8,T%,W$(B%)):T%=T%+2
  500 NEXT:NEXT
  510 IFT%=4PROCD(1,0,8,"All previous
 locations are unknown."):PROCb
  520 PROCC
  530 m%=0:n%=0:ENDPROC
  540 CLS:n%=1:PROCD(2,0,0,"Known loc
ation of weapons at the time"):PROCD(
2,0,2,"the murder occurred."+r$+STRIN
G$(16,CHR$255)):GOTO470
  550 DEFPROCF
  560 CLS:A$=r$+"ACCUSATION"+y$+"The
":b$="Key in the number of the ":PROC
D(3,0,0,A$+"Murderer was -")
  570 T%=2:FORB%=0TO9:PROCD(7,6,T%,CH
R$(B%+48)+r$+S$(B%)):T%=T%+2:NEXT:PRO
CD(3,0,22,f$+b$+"murderer.")
  580 *FX15,1
  590 REPEATX%=INSTR("0123456789",GET
$):UNTILX%:X%=X%-1
  600 CLS:PROCD(3,0,0,A$+"Murder took
 place in -")
```

```
  610 T%=2:FORB%=0TO9:PROCD(7,6,T%,CH
R$(B%+48)+r$+R$(B%)):T%=T%+2:NEXT:PRO
CD(3,0,22,f$+b$+"room.")
  620 *FX15,1
  630 REPEATY%=INSTR("0123456789",GET
$):UNTILY%:Y%=Y%-1
  640 CLS:PROCD(3,0,0,A$+"Weapon used
 was -")
  650 T%=2:FORB%=0TO9:PROCD(7,6,T%,CH
R$(B%+48)+r$+W$(B%)):T%=T%+2:NEXT:PRO
CD(3,0,22,f$+b$+"weapon.")
  660 *FX15,1
  670 REPEATZ%=INSTR("0123456789",GET
$):UNTILZ%:Z%=Z%-1
  680 IFS(X%,P%,1)<>-1CLS:VDU7:PROCP(
5,9,"You must be in the"+i$+"same roo
m"+m$+"as the person you're accusing
"):GOTO820
  690 CLS:PROCP(1,0,"Your accusation
reads as follows "):PROCP(3,3,"Cecil
Effingham was murdered in "+R$(Y%)+"b
y "+S$(X%)+"who used "+W$(Z%))
  700 PROCD(2,1,12,"Is this correct Y
/N ?"):A$=GET$
  710 IFA$="N"ORA$="n"GOTO560
  720 IFA$="Y"ORA$="y"ELSEVDU7:GOTO70
0
  730 IFX%=K%ANDZ%=W%ANDY%=M%PROCD(5,
0,12,f$+"CONGRATULATIONS ! You were r
ight."):S%=S%+1000*(D%-1):PROCf:PROCC
:PROCY:GOTO830ELSEPROCD(5,0,12,f$+"A
false accusation !  "):PROCb
  740 IFX%<>K%ANDZ%<>W%ANDY%<>M%S%=S%
-750
  750 IF(X%<>K%ANDZ%<>W%)OR(Z%<>W%AND
Y%<>M%)OR(X%<>K%ANDY%<>M%)S%=S%-500
  760 S%=S%-250
  770 b$="at the time of the murder "
:c$="was in "
  780 FORB%=0TO9
  790 IFX%<>K%ANDS(X%,B%,0)=-1ANDB%<>
Y%PROCP(2,15,S$(X%)+c$+R$(B%)+b$):S(X
%,B%,2)=-1:GOTO820
  800 IFZ%<>W%ANDW(Z%,B%,0)=-1ANDB%<>
Y%PROCP(2,15,b$+W$(Z%)+c$+R$(B%)):W(Z
%,B%,2)=-1:GOTO820
  810 NEXT
  820 PROCC:ENDPROC
  830 IFS%>H%H%=S%
  840 RUN
  850 CLS
  860 PROCD(2,9,2,"Detective Rank"):P
RINTTAB(7,4)r$;STRING$(23,CHR$255):RE
STORE4190:FORB%=1TO5:READd$
  870 IFB%=D%PROCD(3,7,4+B%*2,CHR$(B%
+48)+" "+d$):D$=d$ELSEPROCD(5,7,4+B%*
2,CHR$(B%+48)+" "+d$)
```

→

## ELECTRONICS C.A.D.

### "ANALYSER I & II"

PERFORMANCE ANALYSIS of LINEAR CIRCUITS using the BBC MODEL B AND SINCLAIR SPECTRUM 48K MICRO'S.
Simulates Resistors, Capacitors, Inductors, Transformers, Bipolar and Field effect Transistors, and Operational Amplifiers in any circuit configuration.
Performs FREQUENCY RESPONSE ANALYSIS on Circuits with up to 30 Nodes and 100 Components, for Phase and Gain/Loss, Input Impedance and Output Impedance.
Ideal for the analysis of ACTIVE and PASSIVE FILTERS, AUDIO, WIDEBAND and R.F. AMPLIFIERS, LINEAR INTEGRATED CIRCUITS etc, etc.
"ANALYSER" can greatly reduce or even eliminate the need to breadboard new designs.
USED BY INDUSTRIAL AND UNIVERSITY R&D DEPARTMENTS WORLDWIDE.
VERY EASY TO USE. PRICES FROM £20 ACCESS OR AMERICAN EXPRESS WELCOME . . .
*For further details write or phone:* **NUMBER ONE SYSTEMS LIMITED**
**DEPARTMENT MU, 9A CROWN STREET, ST IVES**
**HUNTINGDON, CAMBS. UK PE17 4EB**
**TEL: 0480 61778 TELEX: 32339**

## SPIDER

### REAL-TIME CONTROL FOR THE BBC MICRO

***Look out for the SPIDER***

*SPIDER – stamps out I/O bugs*

***A breakthrough in ease-of-use for all Control Applications***

***Here's what you get:***

- ***Additional BASIC commands – which can be safely mixed with existing BASIC keywords.***
- ***Invoke BASIC PROCs from function keys or by external events.***
- ***Run up to 8 independent countdown timers.***
- ***The SPIDER is a powerful combination of RAM and ROM mounted on a butterfly board – it leaves the Beeb's memory intact.***
- ***It's easy to install with no soldering required – and a comprehensive manual is supplied.***

***SEND NOW FOR OUR INFORMATIVE LEAFLET – YOU'LL BE SURPRISED AT HOW POWERFUL A SPIDER CAN BE!***

*Paul Fray Ltd*
*Willowcroft, Histon Road, Cambridge CB4 3JD*
*Telephone: (0223) 66529*

***£65.00 including VAT***

Compumart

*Mega Deals*

***Best Prices for***
**BLANK DISKS**
***in the UK.***
Top Quality 5¼" Bulk Packed Disks
(Hub-Ringed and in White Envelopes with a Lifetime Warranty)

**FREE!!! Plastic Library Case worth £2 when you buy 10 Disks**

**FREE!!! Perspex Disk Storage Box worth £10 when you buy 50 Disks**

| | |
|---|---|
| 10 – 5¼" SINGLE SIDED/DOUBLE DENSITY BLANK DISKS (with FREE case) | **£9.95** + £1 p&p |
| 10 – 5¼" DOUBLE SIDED/DOUBLE DENSITY BLANK DISKS (with FREE case) | **£13.95** + £1 p&p |
| 50 – 5¼" SINGLE SIDED/DOUBLE DENSITY BLANK DISKS (with FREE Storage Box) | **£49.95** + £2 p&p |
| 50 – 5¼" DOUBLE SIDED/DOUBLE DENSITY BLANK DISKS (with FREE Storage Box) | **£69.95** + £2 p&p |

**GOODS DESPATCHED: Same day 1st Class Post**
**MONEY BACK GUARANTEE: If you are not completely satisfied with your purchase we will either exchange your disks or give a FULL REFUND – that's the Compumart Guarantee.**

**Please send cheques/postal orders to:**
**Compumart, (Dept MU)**
**71 Gracedieu Road, Loughborough**
**Leics. LE11 0QF Tel (0509) 262259**

VISA

**See Our Great Deals on Atari's in this issue**

## D.F.S. CHIPS – BEST PRICES
## Eproms, Memories, CPU's

| **BBC D.F.S. Interface Chips** | |
|---|---|
| 8271 | £45.00 |
| 74LS00 | 28p |
| 74LS10 | 25p |
| 7438 | 40p |
| 74LS123 | £1.00 |
| 74LS393 | £1.20 |
| 4013 | 60p |
| 4020 | 90p |
| 2764 | £4.20 |
| 27128 | £8.00 |
| D.F.S. Kit Price | £49.50 |
| D.N.F.S. Kit Price | £52.80 |

Please include 60p p&p to all UK orders. Plus 15% VAT to total.

**Disc Drive Bargains**
Brand new Mitsubishi 80/T Double Sided, Half Height (uncased) £110 each or 2 for £200.

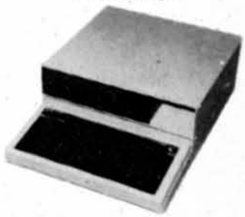
**Nightingale Modems**
Pace Nightingale Multi-Function Modem £114

**MARTELEC LIMITED**
**43 Queens Road, Farnborough, Hants GU14 6JP.**
**Tel: 0252 515666**

## Expandable console for the BBC Micro

### As supplied to Universities, Colleges, Schools, Business and Home Users.

**SPECIAL TORCH MODEL AVAILABLE: £40.99**
+ £4 carriage



Not just a monitor/tv stand but an expansion console which gives your micro the professional look. Protects and encloses your micro with room for disc drives and 2nd. processor or teletext adapter etc., all untidy connecting wires safely out of sight within the console. Made of light yet strong aluminium with a textured finish in matching BBC colour. Available now a bolt on extra module to the console for further expansion options. YES this console will grow with your needs. Basic BBC console as shown **£39.99** + £4 carriage.

**Bolt on expansion module £14.99** + £2 p&p
**Free security bracket to educational users on request.**

**Matching Printer Stand, can double for VDU Stand over the micro – only £14.99** + £2 carriage

### ELECTRON CONSOLE

The console will house the ELECTRON and will safely support the expansion interfaces which will plug into the rear of the micro and will support the VDU at eye level. Tidies up all wiring between the micro, cassette and VDU. The console stores the cassette and tapes and will allow space for drives at a later date.
**Electron console as shown £29.99 + £3 p&p**

***Mail order only - viewing by appointment***
Please add 15% VAT.
*For further information or send cheque to:*

• STOCK-TAKING SALE

Silent COMPUTERS 73 LANSDOWNE ROAD, LONDON N17
TEL: 01-801 3014 (24 Hr Ansaphone)

## CUSTOM BLOWN EPROMS

**UP TO 8K (IFID) £6**
**UP TO 16K (3FID) £8**

Simply send your program on disk/tape stating clearly your name and address and your program name. If using tape please make sure your program is the first on the tape. If using disc please state DFS and whether S/D density.

*Sorry, but no copyright material.*

***All prices include VAT & P&P. Orders to:***
**CBE SERVICES**
**4 BRICK KILN LANE,**
**MANSFIELD, NOTTS. NG18 5JZ.**

From Page 161

```
  880 NEXT
  890 PROCP(2,18,"Key in the number t
o change the rank or"+y$+"SPACE BAR"+
g$+"to return to the menu ")
  900 C%=GET-48:IFC%=-16ENDPROC
  910 IFC%<1ORC%>5VDU7:GOTO900ELSED%=
C%:GOTO860
  920 CLS:PROCD(5,9,5,"PAUSE or QUIT
?"):PROCD(2,0,10,"Press"+i$+"SPACE"+g
$+"to resume investigations."):p%=TIM
E
  930 PROCD(2,0,15,"Press"+i$+"'Q'"+g
$+"to quit investigations.")
  940 A$=GET$
  950 IFA$=" "THENTIME=p%:ENDPROC
  960 IFA$="Q"ORA$="q"S%=0:PROCY:RUN
ELSE940
  970 DEFPROCS
  980 FORB%=1TOD%
  990 p%=RND(10)-1:u%=RND(10)-1:v%=RN
D(10)-1:x%=RND(10)-1:y%=RND(10)-1:z%=
RND(10)-1
 1000 c=0:w=0:FORC%=0TO9
 1010 IFS(C%,y%,1)=-1c=c+1
 1020 IFW(C%,z%,1)=-1ORW(C%,z%,3)=-1w
=w+1
 1030 NEXT
 1040 IFw>3B%=D%:GOTO1080
 1050 IFc>3B%=D%:GOTO1080
 1060 IFS(p%,v%,1)=-1S(p%,v%,1)=0:S(p
%,v%,3)=0:S(p%,y%,1)=-1
 1070 IFW(u%,x%,1)=-1ANDW(u%,x%,3)<>-
1W(u%,x%,1)=0:W(u%,z%,1)=-1
 1080 NEXTB%
 1090 ENDPROC
 1100 DEFPROCH
 1110 PROCG
 1120 FORB%=0TO9:PROCD(7,0,3+B%*2,CHR
$(B%+48)+" "+CHR$129+R$(B%)):NEXT
 1130 PROCD(2,16,9,"Which room next ?
")
 1140 *FX15,1
 1150 REPEATB%=INSTR("0123456789",GET
$):UNTILB%:B%=B%-1
 1160 S%=S%-ABS(P%-B%):P%=B%
 1170 PROCD(3,16,11,R$(P%))
 1180 PROCC
 1190 IFS%<=0S%=0:PROCY:RUN ELSEPROCG
 1200 PROCD(5,0,2,"In this room you f
ind :-"):T%=4
 1210 o%=0:FORB%=0TO9
 1220 IFS(B%,P%,1)=-1PROCD(3,(38-LEN(
S$(B%)))/2,T%,S$(B%)):T%=T%+2:S(B%,P%
,3)=-1:o%=o%+1:I%=B%
 1230 NEXT
 1240 IFo%=0O$="":o$="":PROCD(1,15,4,
"no-one!"):PROCb ELSEO$="Obtain a sta
tement from a suspect.(O)":o$="Make
an accusation.(A)"
 1250 PROCD(1,0,12,"What will you do
?"):PROCD(2,0,14,O$):PROCD(2,0,16,"Se
arch the room for hidden clues.(S)")
:PROCD(2,0,18,"Leave the room for els
ewhere.(L)"):PROCD(2,0,20,o$)
 1260 PRINTTAB(1,22)r$;STRING$(38,CHR
$255):PRINTTAB(13,23)h$r$"Score";y$S%
;TAB(13,24)h$r$"Score"y$S%;
 1270 *FX15,1
 1280 A$=GET$
 1290 IF(A$="A"ORA$="a")ANDo%<>0PROCF
:GOTO1190
 1300 IF(A$="O"ORA$="o")ANDo%<>0PROCQ
:GOTO1190
 1310 IFA$="L"ORA$="l"ENDPROC
 1320 IFA$="S"ORA$="s"PROCK:GOTO1190E
LSEVDU7:GOTO1280
 1330 DEFPROCG:CLS:PROCP(5,0,"You are
 in"+R$(P%)):ENDPROC
 1340 DEFPROCQ
 1350 IFo%=1GOTO1430
 1360 PROCG:T%=8
 1370 PROCP(2,3,"Which suspect do you
 wish to get a statement from ? Key n
umber ")
 1380 FORB%=0TO9
 1390 IFS(B%,P%,1)=-1PROCD(3,8,T%,CHR
$(B%+48)+"  "+S$(B%)):T%=T%+2
 1400 NEXT
 1410 *FX15,1
 1420 REPEATI%=INSTR("0123456789",GET
$):UNTILI%:I%=I%-1
 1430 IFQ%=P%ANDN%=I%ELSEU%=18-D%*2
 1440 Q%=P%:N%=I%
 1450 IFS(I%,P%,1)<>-1VDU7:GOTO1410
 1460 PROCG:PROCP(2,2,CHR$129+S$(I%)+
g$+"makes the following statement "):
PROCN(I%,P%)
 1470 IFU%<1PROCS:PROCC:ENDPROC
 1480 PRINTTAB(0,23)h$g$"Another stat
ement"i$"Y/N ?";TAB(0,24)h$g$"Another
 statement"i$"Y/N ?";:A$=GET$
 1490 *FX15,1
 1500 IFA$="Y"ORA$="y"GOTO1460
 1510 IFA$="N"ORA$="n"ENDPROC ELSEVDU
7:GOTO1480
 1520 ENDPROC
 1530 DEFPROCK:CLS:T%=12:PROCG
 1540 C%=0
 1550 IFW(C%,P%,3)=-1ANDq%=0GOTO1580
 1560 C%=C%+1:IFC%>9ELSE1550
 1570 GOTO1620
 1580 PROCP(3,6,"Remember, you have a
lready searched in"+r$+R$(P%)+y$+"and
 found ")
 1590 FORB%=0TO9
 1600 IFW(B%,P%,3)=-1PROCD(1,(38-LEN(
W$(B%)))/2,T%-1,W$(B%)):T%=T%+2
 1610 NEXT:GOTO1740
 1620 PROCD(3,0,3,"Do you wish to mak
e a quick search"):PROCD(3,0,5,"(Q) o
r a thorough search (T) ?")
 1630 *FX15,1
 1640 A$=GET$
 1650 IFA$="Q"ORA$="q"A$="A quick":R%
=D%+4:GOTO1670
 1660 IFA$="T"ORA$="t"A$="A thorough"
:R%=D%+8ELSEVDU7:GOTO1640
 1670 S%=S%-(20-R%):o=0
 1680 PROCD(4,0,8,"Searching "+R$(P%)
+"."):p%=TIME:REPEAT:SOUND1,-9,25,2:S
OUND1,-9,50,2:UNTILTIME>p%+(R%*25):PR
OCS
 1690 FORB%=0TO9
 1700 PROCD(3,0,8,A$+y$+"search of"+r
$+R$(P%)):PROCD(3,0,10,"has uncovered
 :- ")
 1710 IFW(B%,P%,1)=-1ANDRND(R%)>1ANDW
(B%,P%,3)<>-1PROCD(1,(38-LEN(W$(B%)))
/2,T%,W$(B%)):T%=T%+2:W(B%,P%,3)=-1:i
=B%:o=o+1:S%=S%+D%*RND(9):PROCf
 1720 NEXT
 1730 IFo=0PROCD(11,14,12,"Nothing !"
):PROCb
 1740 PROCD(2,0,20,"Do you wish to se
arch again (Y/N) ?")
 1750 *FX15,1
 1760 G$=GET$:IFG$="Y"ORG$="y"q%=1:PR
OCK:ENDPROC
 1770 IFG$="N"ORG$="n"q%=0:CLS:ENDPRO
C ELSEVDU7:GOTO1760
 1780 ENDPROC
 1790 DEFPROCB:S%=S%-(INT(TIME/500))+
j%:j%=INT(TIME/500):IFS%<0S%=0
 1800 ENDPROC
 1810 DEFPROCs:S%=S%-50:ENDPROC
 1820 DEFPROCJ:CLS
 1830 PRINTTAB(3,2)y$"BATHROOM";TAB(1
5,3)y$"BEDROOM";TAB(29,4)y$"STUDY";TA
B(3,9)y$"DINING";TAB(4,10)y$"ROOM";TA
B(3,16)y$"KITCHEN"
 1840 PRINTTAB(28,12)y$"LOUNGE";TAB(1
5,12)y$"BALLROOM";TAB(2,21)y$"CELLAR"
;TAB(16,21)y$"HALL";TAB(28,19)y$"LIBR
ARY"
 1850 PRINTTAB(0,0)r$;STRING$(38,CHR$
255)
 1860 FORT%=1TO23
 1870 PRINTTAB(0,T%)r$;CHR$255
 1880 IFT%>18THEN1920
 1890 IFT%=3ORT%=9THEN1910
 1900 PRINTTAB(12,T%)r$;CHR$255
 1910 IFT%=3ORT%=11ORT%=18THEN1930
 1920 PRINTTAB(25,T%)r$;CHR$255
```

→

*From Page 163*

```
 1930 PRINTTAB(37,T%)r$;CHR$255
 1940 IFT%>19PRINTTAB(9,T%)r$;CHR$255
 1950 NEXT
 1960 PRINTTAB(0,4)r$;STRING$(13,CHR$
255);TAB(25,8)r$;STRING$(5,CHR$255);"
  ";STRING$(6,CHR$255);TAB(0,14)r$;ST
RING$(6,CHR$255);"  ";STRING$(5,CHR$2
55)
 1970 PRINTTAB(25,16)r$;STRING$(5,CHR
$255);"  ";STRING$(6,CHR$255);TAB(0,1
9)r$;STRING$(4,CHR$255);"  ";STRING$(
4,CHR$255);"  ";STRING$(6,CHR$255);"
 "STRING$(6,CHR$255)
 1980 PRINTTAB(12,6)r$;STRING$(14,CHR
$255);TAB(0,23)r$;STRING$(38,CHR$255)
 1990 PROCC:ENDPROC
 2000 DEFPROCD(c,x,y,z$):PRINTTAB(x,y
);h$;CHR$(c+128);z$;TAB(x,y+1);h$;CHR
$(c+128);z$:ENDPROC
 2010 DEFPROCC
 2020 *FX15,1
 2030 PRINTTAB(2,24)y$;STRING$(11,CHR
$255);f$;"SPACE BAR ";STRING$(12,CHR$
255);:A$=GET$:IFA$=" " CLS:ENDPROC EL
SEVDU7:GOTO2030
 2040 DEFPROCY
 2050 CLS:PROCD(3,9,7,f$+"G A M E
O V E R"):PROCD(5,10,11,"( Murder Sum
mary )"):PRINT'''y$"  Your Score";i$;
S%;y$"   High Score";i$;H%:PROCC:CLS
 2060 FORC%=0TO9
 2070 PRINT"   Room  :"y$;R$(C%)''
 2080 p$="was here at the time of the
 murder.":q$="is now to be found here
."
 2090 FORB%=0TO9
 2100 IFS(B%,C%,0)<>0i=B%:PRINT;y$+S$
(B%)'+r$+p$;'
 2110 IFW(B%,C%,0)<>0j=B%:PRINT;y$+W$
(B%)'+r$+p$'
 2120 IFS(B%,C%,1)=-1PRINT;m$+S$(B%)'
+r$+q$'
 2130 IFW(B%,C%,1)=-1PRINT;m$+W$(B%)'
+r$+q$'
 2140 NEXT
 2150 IFC%=M%PRINTr$"The murder was c
ommitted in"'+y$+R$(C%)+r$"by"+y$+S$(
i);'r$"using"+y$+W$(j)
 2160 PROCC
 2170 NEXT
 2180 CLS:PROCD(7,6,7,"Another Invest
igation ?"):PROCC
 2190 ENDPROC
 2200 DEFPROCI
 2210 RESTORE4160
 2220 FORB%=0TO9:READR$(B%),S$(B%),W$
(B%):NEXT
 2230 M%=RND(10)-1
 2240 FORC%=2TO3:FORB%=0TO9:FORG%=0TO
9:S(G%,B%,C%)=0:W(G%,B%,C%)=0:NEXT:NE
XT:NEXT
 2250 PROCD(1,5,13,"A Murder Investig
ation.")
 2260 FORC%=0TO1:PROCr
 2270 FORB%=0TO9
 2280 IFB%=M%ANDC%=0S(A(B%),B%,C%)=1:
K%=A(B%)ELSES(A(B%),B%,C%)=-1
 2290 NEXT
 2300 PROCD(4,10,17,"by"+g$+"Ken Smit
h.")
 2310 NEXT
 2320 FORC%=0TO1:PROCr
 2330 FORB%=0TO9
 2340 IFB%=M%ANDC%=0W(A(B%),B%,C%)=1:
W%=A(B%)ELSEW(A(B%),B%,C%)=-1
 2350 NEXT
 2360 NEXT
 2370 RESTORE4200:FORB%=0TO52:READA$(
B%):NEXT
 2380 RESTORE4190:READD$
 2390 ENDPROC
 2400 DEFPROCr
 2410 FORB%=0TO9
 2420 PROCR
 2430 A(B%)=R%
 2440 IFB%=0GOTO2480
 2450 E%=0
 2460 IFA(E%)<>A(B%)ELSE2420
 2470 E%=E%+1:IFE%<>B%GOTO2460
 2480 NEXT
 2490 ENDPROC
 2500 DEFPROCR:R%=RND(10)-1:ENDPROC
 2510 DEFPROCP(c,y,z$)
 2520 z=LEN(z$):z$=LEFT$(z$,z-1)+". "
 2530 w$="":L$="":sw=39:FORF%=1TOLEN(
z$)
 2540 S$=MID$(z$,F%,1):A%=ASC(S$)
 2550 IFA%>96ANDA%<123ANDF%=1A%=A%-32
:S$=CHR$A%
 2560 IFA%<>32ANDA%<129w$=w$+S$:GOTO2
590
 2570 IFsw<=LEN(w$)+1PROCD(c,0,y,L$):
sw=39:y=y+2:L$=""
 2580 L$=L$+w$+S$:sw=sw-(LEN(w$)+1):w
$=""
 2590 NEXT:PROCD(c,0,y,L$)
 2600 ENDPROC
 2610 DEFPROCA(R%)
 2620 a%=-1:b%=-1:c%=-1:d%=-1
 2630 IFR%=0V%=1:a%=1:GOTO2730
 2640 IFR%=9V%=7:a%=7:GOTO2730
 2650 IFR%=1a%=0:b%=2:J%=RND(2):V$=MI
D$("02",J%,1)
 2660 IFR%=2a%=1:b%=3:J%=RND(2):V$=MI
D$("13",J%,1)
 2670 IFR%=3a%=2:b%=4:c%=5:J%=RND(3):
V$=MID$("245",J%,1)
 2680 IFR%=4a%=3:b%=5:J%=RND(2):V$=MI
D$("35",J%,1)
 2690 IFR%=5a%=3:b%=4:c%=6:d%=8:J%=RN
D(4):V$=MID$("3468",J%,1)
 2700 IFR%=6ORR%=8a%=5:b%=7:J%=RND(2)
:V$=MID$("57",J%,1)
 2710 IFR%=7a%=6:b%=8:c%=9:J%=RND(3):
V$=MID$("689",J%,1)
 2720 V%=ASC(V$)-48
 2730 IFb%=-1b%=a%
 2740 IFc%=-1c%=a%
 2750 IFd%=-1d%=a%
 2760 ENDPROC
 2770 DEFPROCN(I%,P%)
 2780 Q$="":T%=7:a$=A$(RND(7)-1)
 2790 IFI%=K%L%=1ELSEL%=0
 2800 r%=RND(10)-1:IFr%=P%GOTO2800
 2810 FORB%=0TO9
 2820 IFS(B%,P%,0)<>0s%=B%
 2830 IFW(B%,P%,0)<>0w%=B%
 2840 IFS(I%,B%,0)<>0e%=B%ELSE2880
 2850 FORC%=0TO9
 2860 IFW(C%,e%,0)<>0f%=C%
 2870 NEXT
 2880 IFS(B%,r%,0)<>0g%=B%
 2890 IFW(B%,r%,0)<>0h%=B%
 2900 NEXT
 2910 t%=t%+1:IFt%>9t%=RND(8)
 2920 b$=""
 2930 IFU%>10ELSE3070
 2940 IFt%=1ANDS(I%,P%,0)<>0b$=A$(19)
+A$(7)+A$(21):S(I%,P%,2)=-1:PROCs
 2950 IFt%=1ANDL%=1b$=A$(19)+A$(7)+A$
(21):S(I%,P%,2)=-1:PROCs
 2960 IFt%=2ANDS(s%,P%,0)<>0ANDs%<>I%
b$=S$(s%)+A$(7)+A$(21):S(s%,P%,2)=-1:
PROCs
 2970 IFt%=3AND(W(f%,e%,0)<>0ORL%=1)b
$=W$(f%)+A$(7)+A$(12)+A$(30)
 2980 IFt%=4ANDW(w%,P%,0)<>0b$=W$(w%)
+A$(7)+A$(21):W(w%,P%,2)=-1:PROCs
 2990 IFt%=5ANDg%<>I%b$=S$(g%)+A$(7)+
R$(r%):S(g%,r%,2)=-1:PROCs
 3000 IFt%=6b$=W$(h%)+A$(7)+R$(r%):W(
h%,r%,2)=-1:PROCs
 3010 IFt%=7ANDS(I%,e%,0)<>0b$=A$(19)
+A$(7)+R$(e%):S(I%,e%,2)=-1:PROCs
 3020 IFt%=7ANDL%=1b$=A$(19)+A$(7)+R$
(g%):S(I%,g%,2)=-1:PROCs
 3030 IFt%=8ANDW(f%,e%,0)<>0b$=A$(19)
+A$(7)+A$(12)+W$(f%)
 3040 IFt%=8ANDL%=1b$=A$(19)+A$(7)+A$
(12)+W$(h%)
 3050 IFt%=9ANDg%<>I%b$=S$(g%)+A$(7)+
A$(12)+W$(h%)
 3060 IFb$=""ELSE3990
```

→

**MICROMAN Computers**

ACORN SPECIALIST COMPUTER CENTRE

**NEW ACORN PRODUCT**

| | |
|---|---|
| BBC B Plus 64K | 469.00 |
| BBC B Plus 128K | 499.00 |
| BBC B Plus 64-128K Upgrade | 30.00 |
| ADFS Upgrade | 29.90 |
| 1770 Upgrade | 49.90 |

**BBC COMPUTERS:**

| | |
|---|---|
| BBC Model B | P.O.A. |
| BBC Model B + DFS | P.O.A. |
| BBC Model B + Econet | P.O.A. |
| BBC Model B + DFS + Econet | P.O.A. |
| Acorn Prestel Receiver | 139.00 |
| Acorn 6502 2nd Processor | 199.00 |
| Acorn Z80 2nd Processor | 359.00 |
| Acorn IEEE Interface | 325.00 |
| Bitstick | 375.00 |

**HARD DISC SYSTEMS**

| | |
|---|---|
| Acorn 10MByte Hard Disc + Level 3 | 1699.00 |
| Acorn 30 Mbyte Hard Disc + Level 3 | 2499.00 |

**TORCH COMPUTERS:**

| | |
|---|---|
| Z80 Disc Pack | 750.00 |
| Z80 2nd Processor Card | 339.00 |

**ECONET SYSTEM:**

| | |
|---|---|
| Full Service Available | P.O.A. |

**BBC FIRMWARE:**

| | |
|---|---|
| View 3 – New – | P.O.A. |
| View ROM | 59.80 |
| Wordwise ROM | 44.85 |
| Wordwise Plus ROM | 56.35 |
| Viewsheet ROM | 59.80 |
| Speech Synthesizer | 55.00 |
| Ultracalc Spreadsheet ROM | 79.50 |
| Inter-Sheet | 56.35 |
| Inter-Chart | 44.85 |
| Accelerator | 64.40 |
| The Speech ROM | 33.35 |
| Graphics ROM | 33.35 |
| Disc Doctor ROM | 33.35 |
| Printmaster ROM | 33.35 |
| Communicator ROM | 69.00 |
| Termi Emulator ROM | 33.35 |
| Gremlin Debug ROM | 33.35 |
| Toolstar ROM | 34.00 |
| Commstar EPROM | 34.00 |
| BCPL ROM | 59.80 |
| System ADE ROM | 60.00 |
| System SPY ROM | 30.00 |
| Merlin Scribe | 59.95 |
| Merlin Database | 49.00 |
| Merlin Datascribe | 95.00 |
| Beebug Soft - Full range available | |
| Acorn ISO Pascal | 69.00 |
| Acorn Logo ROM | 69.00 |
| Slave Plus ROM | 39.95 |
| Floppywise Disc Utility ROM | 29.95 |
| Comal | 49.85 |
| Vine Replay (8271/1770) | 35.00 |
| Vine TD (8271/1770) | 18.00 |
| Termulator – NEW | 34.50 |
| Graphics Ext. – NEW | 29.90 |
| Basic Editor – NEW | 29.95 |

**BBC UPGRADES:**

| | |
|---|---|
| A-B Upgrade (Fitted) | 95.00 |
| A-B Upgrade (Excluding Fitting) | 80.00 |
| Acorn DFS Interface (Fitted) | 109.00 |
| Opus DD/DFS Interface | 99.95 |

**EXPANSION BOARDS:**

| | |
|---|---|
| APTL Sidewise ROM Board | 43.70 |
| Aries B20 RAM Expansion Board | 89.95 |
| Aries B12 Sideways ROM Board | 46.00 |
| Aries B12c Adaptor | 5.75 |
| Computer Village ROM Board | 49.00 |

**SOLIDISK PRODUCTS:**

| | |
|---|---|
| Solidisk 32K Sideways RAM | 57.95 |
| Solidisk 128K Sideways RAM | 135.00 |
| Solidisk DD/DFS Interface | 39.95 |

| | |
|---|---|
| Eprom Programmer | 20.95 |
| Eprom Eraser | 20.95 |

**PACE 5.25" DISC DRIVES:**

| | |
|---|---|
| PSD1 SS/40T/100K | 99.00 |
| PSD3 DS/40T-80T/400K | 139.00 |
| PDD3 DS/40-80T/800K | 269.00 |

**CUMANA 5.25" DISC DRIVES:**

| | |
|---|---|
| CS100 SS/40T-100K (PSU) | 129.95 |
| CS400 DS/40-80T/400K (PSU) | 179.95 |
| CD800S DS/40-80T/800K (PSU) | 329.95 |
| 3.5" Drives | POA |

**OPUS DRIVES**

| | |
|---|---|
| 5401 SS/40T + DDOS | 149.00 |
| 5802 DS/40/80T + DDOS | 189.00 |
| Opus 5401 + Solidisk 2.0 DDFS | 125.00 |
| Opus 5802 + Solidisk 2.0 DDFS | 179.00 |
| Opus Challenger | NOW IN STOCK |

**DISC UTILITIES:**

| | |
|---|---|
| View Index | 14.95 |
| View Printer Driver Generator | 11.50 |
| Hi-View | 59.80 |
| Acornsoft Database | 15.35 |
| Microtext | 59.00 |
| S-Pascal | 19.90 |
| Turtle Graphics | 19.90 |
| BCPL Calculations | 19.90 |
| Acorn P-System | 299.00 |
| Beebugsoft | FULL RANGE AVAILABLE |
| Island Music System | 29.95 |

**5¼" DISCS (per 10)**

| | |
|---|---|
| Mr Floppy ds-dd 80 tk | 16.50 |

**PRINTERS:**

| | |
|---|---|
| Star S610 NLQ 120cps (Intro offer) | 259.00 |
| Star S615 NLQ 120cps (Intro offer) | 389.00 |
| Cannon PW-1080A | 289.00 |
| Cannon PW1156A | 459.00 |
| Epson LX80 NLQ | 259.00 |
| Juki 6100 Daisywheel | 379.00 |
| Shinwa CP80A | 199.00 |

**MONITORS:**

| | |
|---|---|
| Microvitec Cub Standard | 229.00 |
| Microvitec Cub Medium | 299.00 |
| Philips Amber | 94.00 |
| Philips Green | 89.00 |
| Philips TV/Monitor | 229.00 |

**MODEMS:**

| | |
|---|---|
| Pace Nightingale inc Commstar ROM | 159.85 |
| Pace Auto Dial/Auto Answer Board | 56.55 |
| Pace Auto Dial Utilities Disc | 11.50 |
| Mikefax Viewdata/E Mail Software | 30.00 |

**JOYSTICKS:**

| | |
|---|---|
| Voltmace Delta 14b Handset | 14.95 |
| Voltmace Delta 3b Dual | 19.95 |

**CONTROL/ROBOTICS**

| | |
|---|---|
| AMX Mouse | 89.95 |
| AMX Desk | 24.95 |
| AMX Utilities | 14.95 |
| AMX Paint Pot | 14.95 |
| Commotion EVI/SS Camera | 129.00 |
| Marconi Tracker Ball | 59.80 |
| Valiant Turtle | P.O.A. |

**PLOTTERS**

| | |
|---|---|
| Penman Plotter | P.O.A. |
| Wattanabe A3 Plotter (6 pen) | P.O.A. |
| Epson H180 Plotter A4 | 458.85 |
| Plotmate (A4) | |
| Hitachi 672 (A3, 4 pen) | |
| Roland DXY-880 A3 Plotter | 943.00 |

**INTEGRATED CIRCUITS**

| | |
|---|---|
| Eprom 27128 (250ns) | 3.95 |
| Eprom 2764 (250ns) | 2.95 |
| RAM 6264 LP-15 | 4.95 |

**ACORN APPROVED SERVICE CENTRE**

Our workshops offer a full repair and upgrade service

SHOP OPEN 9-6 Mon-Sat.

We stock a large range of books, educational and games software

EDUCATIONAL & INDUSTRIAL ENQUIRIES WELCOME

**MAIL ORDER SALES**
Next Day Delivery – £8.00
Small Items 1st Class Post – £1.00
Prices include VAT

**RAINFORD INDUSTRIAL ESTATE, MILL LANE,**
**RAINFORD, ST. HELENS, MERSEYSIDE**
**PHONE 074488 5242**

*PRACTICAL PROGRAMS TO . . .*

# SOFTEN YOUR HARDWARE

**For the BBC Micro models B & B+**

**MICRO ARTIST** — **Enhanced Disc Version £14.95** **Cassette £7.50**

The much acclaimed mode 2 drawing program. 8 basic colours, 20 fixed commands including reflect, enlarge, rotate, text, triangles, ellipses, fill, rubber bands, x & y coordinates, continuous or dotted lines etc., plus 12 user re-definable brushes/characters. Requires an analogue joystick. *"Is the best I have seen of a great number of similar packages ranging from £7 to £27 and the cheapest! – It is very good fun".* (CADCAM International June '85). *"A real joy to USE . . . certainly the best drawing program I have yet tested on the BBC. Rating: Overall 100%".* (A & B Computing April '85). The disc version allows SAVEd screens to be flipped through sequentially. DISC UPGRADE available to customers who purchased the cassette version prior to September 1 1985 for an additional £2.50.

**WEATHER-CHART** — **Disc £12.00** **Cassette £9.50**

Prepares a high resolution map of the British Isles and adjoining Continental coasts and a weather chart for the Sea Areas from data obtained from the BBC Shipping Forecasts or from other sources available to the operator. Wind Force and Direction are plotted to the appropriate Sea Area and Pressure to the appropriate Coastal Station. Isobars can be drawn using an analogue joystick. Complete or intermediate Screens may be SAVEd (on the disc version only). An Epson printer screen dump routine is included with provision for other dump routines to be added.

**CIRCUIT DESIGNER** — **Only on Disc £24.95**

A specialist CAD application for draughting circuit diagrams in the highest available resolution (mode 0) using an analogue joystick or the keyboard. Requires BBC Model B 1.2 OS or Model B+ with single or twin disc drives. A library of 60 standard components is provided and an additional 18 symbols can be operator designed. Symbols can be directly accessed in any order, positioned by cursor, reflected and rotated. Integrated Dual In Line chips are resident in two widths from 6 to 48 pins lying vertically or horizontally. Vertical, horizontal, dotted line, rubber band, x & y coordinates and expandable rectangle functions. Text accepted in choices of height and width. Printer dump routines included for Epson and Seikosha GP 250 or a specific dump may be added.

**MORSE TRANSLATOR** — **Disc £10.50** **Cassette £8.50**

Sounds Morse Code signals received via a radio in the range 6-22wpm and translates them into plain language on the screen. Allows plain language to be translated and sounded in Morse at a choice of speeds. Red function keys may be programmed for user's callsign and standard passages. Program requires either a CW or RTTY interface. (A CW interface has been designed for this program by G3LIV).

**TO ORDER** Please send cheque/PO payable to PAEAN Systems. Specify 40 or 80 Track disc. Orders normally despatched by return at 1st Class rates.

**OTHER TITLES** Please send SAE for our full list.

PAEAN systems

**LITTLE BEALINGS, WOODBRIDGE,**
**SUFFOLK IP13 6LT**
**TEL: (0473) 623757**

## *From Page 164*

```
 3070 IFU%>8ELSE3280
 3080 IFt%=1ANDK%<5b$=A$(24)+A$(25)+A
$(26)+A$(27)
 3090 IFt%=1ANDI%=K%ANDK%>4b$=A$(24)+
A$(25)+A$(26)+A$(27)
 3100 IFt%=2ANDK%>4b$=A$(24)+A$(25)+A
$(26)+A$(28)
 3110 IFt%=2ANDI%=K%ANDK%<5b$=A$(24)+
A$(25)+A$(26)+A$(28)
 3120 IFt%=3ANDK%/2=INT(K%/2)b$=A$(24
)+A$(25)+A$(26)+A$(38)
 3130 IFt%=3ANDK%/2<>INT(K%/2)ANDI%=K
%b$=A$(24)+A$(25)+A$(26)+A$(38)
 3140 IFt%=4ANDr%<>M%b$=A$(24)+A$(25)
+A$(29)+R$(r%)
 3150 IFt%=5ANDg%<>K%ANDg%<>I%b$=A$(2
4)+A$(25)+A$(26)+S$(g%)
 3160 IFt%=6b$=A$(24)+A$(25)+A$(26)+A
$(30)
 3170 IFt%=7ANDh%<>W%b$=A$(24)+A$(25)
+A$(31)+W$(h%)
 3180 IF(t%=8ORt%=9)k%=RND(6)+7ELSE32
70
 3190 IFI%=K%GOTO3260
 3200 IFW%=6ANDk%=8GOTO3180
 3210 IF(W%=0ORW%=2)ANDk%=9GOTO3180
 3220 IFW%=4ANDk%=10GOTO3180
 3230 IFW%=5ANDk%=11GOTO3180
 3240 IF(W%=3ORW%=8ORW%=9)ANDk%=12GOT
O3180
 3250 IFW%=7ANDk%=13GOTO3180
 3260 b$=A$(24)+A$(k%+24):S%=S%-25
 3270 IFb$<>""a$="":GOTO3990
 3280 IFU%>6ELSE3540
 3290 IFt%>4GOTO3370
 3300 PROCA(e%)
 3310 IFt%=1b$=A$(19)+A$(7)+A$(9)+R$(
V%)
 3320 FORI=0TO9
 3330 IFS(I,V%,0)<>0ANDt%=2ANDI<>I%b$
=S$(I)+A$(7)+A$(9)+A$(20)
 3340 IFW(I,V%,0)<>0ANDt%=4b$=W$(I)+A
$(7)+A$(9)+A$(20)
 3350 IFt%=3AND(P%=a%ORP%=b%ORP%=c%OR
P%=d%)b$=A$(19)+A$(7)+A$(9)+A$(21)
 3360 NEXT
 3370 IFt%=9PROCA(P%)ELSE3410
 3380 FORB%=0TO9
 3390 IFS(B%,V%,0)<>0ANDB%<>I%b$=A$(9
)+A$(21)+A$(22)+S$(B%)
 3400 NEXT
 3410 IFt%>6GOTO3470
 3420 PROCA(r%)
 3430 FORB%=0TO9
 3440 IFW(B%,V%,0)<>0ANDt%=5b$=W$(B%)
+A$(7)+A$(9)+R$(r%)
 3450 IFS(B%,V%,0)<>0ANDt%=6ANDB%<>I%
b$=S$(B%)+A$(7)+A$(9)+R$(r%)
 3460 NEXT
 3470 PROCA(M%)
 3480 FORB%=0TO9
 3490 IFS(B%,V%,0)<>0ANDt%=7ANDB%<>I%
b$=S$(B%)+A$(7)+A$(9)+A$(23)
 3500 IFS(I%,V%,0)<>0ANDt%=7b$=A$(19)
+A$(7)+A$(9)+A$(23)
 3510 IFW(B%,V%,0)<>0ANDt%=8b$=W$(B%)
+A$(7)+A$(9)+A$(23)
 3520 NEXT
 3530 IFb$=""ELSE3990
 3540 IFU%>4ELSE3700
 3550 IFt%=1ANDS(I%,P%,0)<>-1b$=A$(19
)+A$(8)+A$(21)
 3560 IFt%=1ANDS(I%,P%,0)=1b$=A$(19)+
A$(8)+A$(21)
 3570 IFt%=2ANDf%<>h%b$=W$(h%)+A$(8)+
A$(12)+A$(30)
 3580 IFt%=2ANDf%=h%ANDI%=K%b$=W$(h%)
+A$(8)+A$(12)+A$(30)
 3590 IFt%=3ANDg%<>I%b$=S$(g%)+A$(8)+
A$(21)
 3600 IFt%=4ANDh%<>w%b$=W$(h%)+A$(8)+
A$(21)
 3610 B%=RND(10)-1:IFB%=I%GOTO3610
 3620 IFt%=5ANDS(B%,r%,0)<>-1ANDB%<>I
%b$=S$(B%)+A$(8)+R$(r%)
 3630 IFt%=6ANDW(B%,r%,0)<>-1 b$=W$(B
%)+A$(8)+R$(r%)
 3640 IFt%=7ANDr%<>e%b$=A$(19)+A$(8)+
R$(r%)
 3650 IFt%=7ANDr%=e%ANDI%=K%b$=A$(19)
+A$(8)+R$(r%)
 3660 IFt%=8ANDr%<>e%b$=A$(19)+A$(8)+
A$(12)+W$(h%)
 3670 IFt%=8ANDr%=e%ANDI%=K%b$=A$(19)
+A$(8)+A$(12)+W$(h%)
 3680 IFt%=9ANDW(B%,r%,0)<>S(B%,r%,0)
b$=S$(B%)+A$(8)+A$(12)+W$(B%)
 3690 IFb$=""ELSE3990
 3700 IFU%>2a$=""ELSE3940
 3710 FORB%=0TO9
 3720 IFW(B%,r%,1)=-1i%=B%
 3730 NEXT
 3740 PROCA(r%)
 3750 IFt%=1AND(W(i%,a%,0)<>0ORW(i%,b
%,0)<>0ORW(i%,c%,0)<>0ORW(i%,d%,0)<>0
)ANDW(i%,r%,1)<>0b$=W$(i%)+A$(7)+A$(9
)+A$(14)+A$(13)
 3760 IFt%=2ANDW(i%,a%,0)=0ANDW(i%,b%
,0)=0ANDW(i%,c%,0)=0ANDW(i%,d%,0)=0b$
=W$(i%)+A$(8)+A$(9)+A$(14)+A$(13)
 3770 FORB%=0TO9
 3780 IFt%=3AND(S(B%,a%,0)<>0ORS(B%,b
%,0)<>0ORS(B%,c%,0)<>0ORS(B%,d%,0)<>0
)ANDI%<>B%b$=S$(B%)+A$(7)+A$(9)+A$(10
)+W$(i%)+A$(11)
 3790 IFt%=4ANDS(B%,a%,0)=0ANDS(B%,b%
,0)=0ANDS(B%,c%,0)=0ANDS(B%,d%,0)=0AN
DI%<>B%b$=S$(B%)+A$(8)+A$(9)+A$(10)+W
$(i%)+A$(13)
 3800 IFt%=5ANDS(B%,r%,0)<>0ANDW(i%,r
%,1)=-1ANDB%<>I%b$=S$(B%)+A$(7)+A$(12
)+W$(i%)+A$(13)
 3810 NEXT
 3820 FORB%=0TO9
 3830 IFW(B%,r%,0)<>0i%=B%
 3840 NEXT
 3850 PROCA(r%)
 3860 IFt%=6ANDW(i%,a%,1)=0ANDW(i%,b%
,1)=0ANDW(i%,c%,1)=0ANDW(i%,d%,1)=0b$
=W$(i%)+A$(18)+A$(9)+A$(14)+A$(17)
 3870 IFt%=7AND(W(i%,a%,1)=-1ORW(i%,b
%,1)=-1ORW(i%,c%,1)=-1ORW(i%,d%,1)=-1
)b$=W$(i%)+A$(13)+A$(16)+A$(9)+A$(14)
+A$(17)
 3880 FORB%=0TO9
 3890 FORC%=0TO9
 3900 IFt%=8ANDW(B%,C%,0)<>0ANDW(B%,C
%,1)=-1b$=W$(B%)+A$(15)
 3910 NEXT
 3920 NEXT
 3930 IFt%=9ANDW(w%,P%,0)<>0 b$=W$(w%
)+A$(7)+A$(21):W(w%,P%,2)=-1:PROCs
 3940 IFb$=""ANDU%<3ELSE3990
 3950 a$=""
 3960 FORB%=1TO9
 3970 IFt%=B%b$=A$(B%+38)
 3980 NEXT
 3990 IFb$=c$ORb$=""GOTO2910
 4000 c$=b$:Q$=a$+b$:PROCP(3,T%,Q$):S
%=S%-(U%+D%)
 4010 U%=U%-2
 4020 IFU%>0ANDT%<8a$=A$(RND(5)+47)+"
, ":b$="":T%=15:GOTO2910
 4030 ENDPROC
 4040 DEFPROCL
 4050 A$="":c=RND(2):r%=RND(10)-1:IFr
%=M% GOTO4050
 4060 FORB%=0TO9
 4070 IFS(B%,r%,0)<>0ANDS(B%,r%,2)=0A
NDc=1S(B%,r%,2)=-1:A$=S$(B%)
```

```
 4080 IFW(B%,r%,0)<>0ANDW(B%,r%,2)=0A
NDc=2W(B%,r%,2)=-1:A$=W$(B%)
 4090 NEXT:PROCs:PROCf
 4100 IFA$=""GOTO4050
 4110 CLS:PROCD(5,0,4,"A note is hand
ed to you saying:-"):PROCP(2,8,A$+"wa
s in "+R$(r%)+"at the time of the mur
der "):PROCD(5,0,14,"The note is unsi
gned.")
 4120 PROCC:ENDPROC
 4130 DEFPROCb:SOUND1,-15,20,6:SOUND1
,-15,0,6:ENDPROC
 4140 DEFPROCf:LOCALA,B:RESTORE4150:F
ORI=1TO6:READ A,B:SOUND1,0,0,1:SOUND1
,-15,A,B:NEXT:ENDPROC
 4150 DATA53,1,61,1,69,1,77,4,69,2,77
,4
 4160 DATAthe bathroom ,Dr Adams ,the
 carving knife ,the bedroom ,Gregg th
e butler ,the chain saw ,the study ,M
ajor Caine ,the duelling pistol ,the
lounge ,Harry the gardener ,the knitt
ing needle ,the library ,Reverend Jon
es
 4170 DATAthe paperweight ,the ballro
om ,Felicity the maid ,the pillow ,th
e dining room ,Mrs Dwight .the rat po
ison ,the kitchen ,Beatrice the nanny
 ,the silk scarf ,the hall ,Lady Effi
ngham ,the walking stick
 4180 DATAthe cellar ,Isabel the cook
 ,the wrench
 4190 DATADetective Constable,Detecti
ve Sergeant,Detective Inspector,Super
intendent,Chief Inspector
 4200 DATAAt the time the murder occu
rred ,When the murder was committed ,
At the time of the murder ,Around the
 time of the murder ,As I recall now
- at about 10.30pm ,At 10.30pm ,Aroun
d 10.30pm
 4210 DATAwas in ,was not in ,an adjo
ining room to ,the one where ,can now
 be found ,the same room as ,is now ,
where it ,has been in the same room a
ll the time ,in ,was earlier ,is not
in
 4220 DATAI ,where I was ,this room ,
was occupied by ,where the murder occ
urred
 4230 DATAThe Earl wasn't ,murdered ,
by ,a woman ,a man ,in ,me ,with ,sho
t ,stabbed ,suffocated ,poisoned ,kil
led by a blow to the head ,strangled
,a servant
 4240 DATAI'm afraid I've nothing mor
e to say at present ,I'm sorry I can'
t be of anymore assistance ,Like to a
ssist you some more but I need time t
o think ,Let me think a while. Come b
ack a little later ,That's about it I
'm afraid
 4250 DATAI've nothing much to add to
 what you already know ,You're the de
tective - you go and find out who did
 it ,No further comment ,I'd rather n
ot say anymore at present
 4260 DATAFurthermore,Also,In additio
n,Moreover,Besides
 4270 *TAPE
 4280 FORI%=0TO TOP-PAGE STEP4
 4290 I%!&E00=I%!PAGE:NEXT
 4300 ?&13=?&13-(PAGE-&E00)DIV256
 4310 PAGE=&E00:RUN
```

*This listing is included in this month's cassette tape offer. See order form on Page 199.*

# CONTRACT BRIDGE

NOW ON DISC!

## BRIDGE-MENTOR II
## "The Disc Version"

We are pleased to announce the NEW disc version of this internationally acclaimed software for the BBC/ELECTRON.
Rewritten for disc with many NEW features!

**PRACTICE YOUR BIDDING : PERFECT YOUR CARD-PLAY**
**CREATE YOUR OWN ARCHIVE OF INTERESTING HANDS**

With high resolution colour graphics and sound, BRIDGE-MENTOR II guides you, step-by step, through expertly analysed hands. A host of features including the spectacular "AUTOPLAY" option. The package now includes the famous "Challenge" hands archive . . . in total-over 60 testing hands to improve your game . . . with unlimited scope for more !!!

***FOR INDIVIDUAL PRACTICE, ANALYSIS and ARCHIVING***

**£17.50 (includes "The Challenge" archive)**

*(State 40/80 track disc)*

10
J
Q
K
A
BRIDGE-MENTOR

**Original Cassette version £9.50**

**"The Challenge" £6.50**

**Cheques to:-** **MINIC BUSINESS SERVICES,**
**12 WOBURN CLOSE,**
**BUSHEY, HERTS WD2 3XA.**

## *From Page 111*

```
  140 FORI%=1TO20
  150 PROCgloop
  160 PROCguzzler
  170 NEXT
  180 UNTILFNFUEL
  190 PROCgame
  200 UNTILFALSE
  210 END
  220 DEFPROCchar
  230 VDU23,230,121,253,143,189,189,1
43,253,121
  240 VDU23,231,158,191,241,189,189,2
41,191,158
  250 VDU23,232,255,36,126,219,219,21
9,195,126
  260 VDU23,233,126,195,219,219,219,1
26,36,255
  270 VDU23,236,0,255,129,189,189,129
,255,0
  280 VDU23,237,126,66,90,90,90,90,66
,126
  290 VDU23,238,0,127,65,93,93,93,67,
126
  300 VDU23,239,126,67,93,93,93,65,12
7,0
  310 VDU23,240,0,254,130,186,186,186
,194,126
  320 VDU23,241,126,194,186,186,186,1
30,254,0
  330 VDU23,242,255,255,255,255,255,2
55,255,255
  340 ENVELOPE1,1,20,-15,-15,5,5,5,10
0,-3,0,-15,100,0
  350 ENVELOPE2,1,20,-20,-20,2,1,1,12
7,0,0,-15,80,80
  360 ENVELOPE3,1,20,-15,-15,6,3,3,12
7,0,0,-15,126,126
  370 ENVELOPE4,1,60,-4,-2,2,25,25,12
7,-4,-2,-2,126,90
  380 C2$=CHR$17+CHR$2
  390 C3$=CHR$17+CHR$3
  400 C4$=CHR$17+CHR$4
  410 CFS$=CHR$17+CHR$11+CHR$17+CHR$1
31+" FUEL LOW "+CHR$17+CHR$128
  420 CFC$=C3$+STRING$(10,CHR$236)
  430 G$=C2$+CHR$242
  440 GU$=C3$+CHR$230
  450 U$=C3$+CHR$32+CHR$11+CHR$8+CHR$
232
  460 D$=C3$+CHR$32+CHR$10+CHR$8+CHR$
233
  470 L$=C3$+CHR$32+CHR$8+CHR$8+CHR$2
31
  480 R$=C3$+CHR$32+CHR$230
  490 HI%=0:S%=0
  500 ENDPROC
  510 DEFPROCstart
  520 IFS%>HI% HI%=S%
  530 S%=0:GU%=3:SC%=0
  540 F%=50:G%=100
  550 ENDPROC
  560 DEFPROCscreen
  570 VDU23;8202;0;0;0;
  580 VDU29,640;480;
  590 VDU19,2,0,0,0,0
  600 CLS:COLOUR3
  610 FORX%=0TO19:S%(X%,31)=128:S%(X%
,2)=128:NEXT
  620 FORY%=0TO31:S%(0,Y%)=128:S%(19,
Y%)=128:NEXT
  630 DD$=CHR$237+CHR$8+CHR$10
  640 PRINTTAB(0,31)CHR$239+STRING$(1
8,CHR$236)+CHR$241;
  650 PRINTTAB(0,0)CHR$11+CHR$238+STR
ING$(18,CHR$236)+CHR$240;
  660 PRINTTAB(0,1)STRING$(30,DD$);
  670 PRINTTAB(19,1)STRING$(30,DD$);
  680 PRINTTAB(0,2)CHR$238+STRING$(18
,CHR$236)+CHR$240;
  690 FORX%=7TO12:FORY%=11TO22:PRINTT
AB(X%,Y%)G$:S%(X%,Y%)=129:NEXT:NEXT
  700 COLOUR4:RESTORE
  710 REPEAT
  720 READX%:IFX%>20 N%=X%:GOTO770
  730 IFN%=238:B%=240:C%=241:D%=239 E
LSEB%=N%:C%=N%:D%=N%
  740 READY%
  750 PRINTTAB(X%,Y%)CHR$N% TAB(19-X%
,Y%)CHR$B% TAB(19-X%,33-Y%)CHR$C% TAB
(X%,33-Y%)CHR$D%
  760 S%(X%,Y%)=128:S%(19-X%,Y%)=128:
S%(19-X%,33-Y%)=128:S%(X%,33-Y%)=128
  770 UNTILN%=255
  780 N%=0
  790 FORI%=1TO8:READX%,Y%:PROCnew(X%
,Y%):NEXT
  800 VDU19,2,2,0,0,0
  810 X%=10:Y%=3:C%=TRUE
  820 PRINTTAB(X%,Y%)GU$
  830 PRINTTAB(1,1)"FUEL ";F%TAB(10,1
)"SC ";S%
  840 ENDPROC
  850 DATA236
  860 DATA2,4,3,4,4,4,5,4,6,4,7,4,8
  870 DATA4,9,4,3,6,4,6,5,6,7,6,8,6
  880 DATA9,6,8,14,9,14,10,16,5,8,6
  890 DATA8,7,8,9,8,8,10,9,10,9,12,8,
12
  900 DATA237
  910 DATA2,7,2,8,2,9,2,10,2,12,2,14
  920 DATA2,16,4,9,4,10,4,11,4,13,4
  930 DATA14,4,15,4,16,6,11,6,12,6,13
  940 DATA6,15,6,16
  950 DATA238
  960 DATA8,16,2,6,4,8,6,10
  970 DATA255
  980 DATA7,10,12,10,7,23,12,23
  990 DATA6,14,6,19,13,14,13,19
 1000 DEFPROCguzzler
 1010 S%(X%,Y%)=0
 1020 IFINKEY-58 IFS%(X%,Y%-1)<>128 P
RINTTAB(X%,Y%)U$:Y%=Y%-1:SOUND2,2,50,
1:GOTO1060
 1030 IFINKEY-42 IFS%(X%,Y%+1)<>128 P
RINTTAB(X%,Y%)D$:Y%=Y%+1:SOUND2,2,50,
1:GOTO1060
 1040 IFINKEY-26 IFS%(X%-1,Y%)<>128 P
RINTTAB(X%,Y%)L$:X%=X%-1:SOUND2,2,100
,1:GOTO1060
 1050 IFINKEY-122 IFS%(X%+1,Y%)<>128
PRINTTAB(X%,Y%)R$:X%=X%+1:SOUND2,2,10
0,1:GOTO1060
 1060 IFS%(X%,Y%)=129 PROCgap ELSEIF(
S%(X%,Y%)<128ANDS%(X%,Y%)>0) PROCrgm(
S%(X%,Y%)) ELSEPROCd(0)
 1070 S%(X%,Y%)=131:ENDPROC
 1080 DEFFNFUEL
 1090 F%=F%-1:PRINTTAB(6,1)C3$;F%CHR$
32
 1100 IFN%=0 =TRUE ELSEIFF%>25 =FALSE
 ELSEIFF%=25 SOUND3,3,50,15:PRINTTAB(
5,31)CFS$; TAB(5,2)CFS$; ELSEIFF%=0 =
TRUE
 1110 =FALSE
 1120 DEFPROCd(T%):T%=TIME+T%:REPEATU
NTILTIME>T%:ENDPROC
 1130 DEFPROCgloop
 1140 IFRND(1500)>G% ENDPROC ELSEIFN%
>1 M%=RND(N%)ELSEIFN%=1 M%=1 ELSE END
PROC
 1150 SOUND1,1,50,3
 1160 PROCnew(U%?M%-1,V%?M%)
 1170 PROCnew(U%?M%+1,V%?M%)
 1180 PROCnew(U%?M%,V%?M%+1)
 1190 PROCnew(U%?M%,V%?M%-1)
 1200 IFC%PROCrem(M%)ELSEC%=TRUE
 1210 ENDPROC
 1220 DEFPROCnew(A%,B%)
 1230 K%=S%(A%,B%)
 1240 IFK%=0 ELSEIFK%<130 ENDPROC ELS
EIFK%=131 C%=FALSE:ENDPROC
 1250 PRINTTAB(A%,B%)G$
 1260 N%=N%+1:U%?N%=A%:V%?N%=B%
 1270 S%(A%,B%)=N%
 1280 ENDPROC
 1290 DEFPROCrem(M%)
```

```
 1300 S%(U%?M%,V%?M%)=129
 1310 IFM%=N% N%=N%-1:ENDPROC
 1320 U%?M%=U%?N%:V%?M%=V%?N%
 1330 S%(U%?N%,V%?N%)=M%
 1340 N%=N%-1
 1350 ENDPROC
 1360 DEFPROCrgm(M%)
 1370 U%?M%=U%?N%:V%?M%=V%?N%
 1380 S%(U%?N%,V%?N%)=M%
 1390 N%=N%-1
 1400 DEFPROCgap
 1410 S%=S%+5
 1420 SOUND3,4,50,2
 1430 PRINTTAB(13,1)C3$;S%
 1440 PROCngw(X%-1,Y%)
 1450 PROCngw(X%+1,Y%)
 1460 PROCngw(X%,Y%+1)
 1470 PROCngw(X%,Y%-1)
 1480 ENDPROC
 1490 DEFPROCngw(A%,B%)
 1500 IFS%(A%,B%)<>129 ENDPROC
 1510 N%=N%+1:U%?N%=A%:V%?N%=B%
 1520 S%(A%,B%)=N%
 1530 ENDPROC
 1540 DEFPROCgame
 1550 IFF%=0 PROCgloopwin ELSE PROCgu
zzlerwin
 1560 COLOUR132:CLS:COLOUR3
 1570 PRINT'''TAB(5)"SCORE CARD"
 1580 PRINTTAB(4)"============"
 1590 PRINT'''TAB(1)"CITIES SAVED ";S
C%
 1600 PRINT''TAB(1)"YOUR SCORE   ";S%
 1610 PRINT''TAB(1)"HIGH SCORE   ";HI
%
 1620 IFGU%<>0 PRINT'''TAB(1)"GUZZLER
S  "STRING$(GU%,GU$+CHR$32)
 1630 IF GU%=0 PRINT''''TAB(5)"GAME O
VER":IF S%>HI% PRINT'TAB(4)"YOU GOT T
HE"''TAB(4)"HIGH SCORE!"
 1640 IF SC%<100 G%=100+14*SC%:F%=50+
5*SC% ELSE G%=1500:F%=550
 1650 IFGU%=0 PROCstart
 1660 FORX%=0TO19:FORY%=0TO31
 1670 S%(X%,Y%)=0:NEXT:NEXT
 1680 PRINTTAB(1,29)"RETURN TO CONTIN
UE"
 1690 COLOUR128
 1700 REPEATUNTILINKEY-74
 1710 ENDPROC
 1720 DEFPROCgloopwin
 1730 PRINTTAB(5,31)CFC$; TAB(5,2)CFC
$;
 1740 GCOL0,2
 1750 GU%=GU%-1
 1760 FORX%=0TO580 STEP4
 1770 Y%=X%:IFY%>450 Y%=450
 1780 SOUND1,-15,(Y%+X%)DIV5,1
 1790 SOUND2,-15,(Y%+X%)DIV6,1
 1800 SOUND3,-15,(Y%+X%)DIV7,1
 1810 MOVEX%,Y%:DRAW-X%,Y%:DRAW-X%,-Y
%:DRAWX%,-Y%:DRAWX%,Y%:NEXT
 1820 COLOUR0:COLOUR130:PRINTTAB(3,6)
"THE GLOOP WINS"TAB(5,10)"YOU RAN OUT
"TAB(7,12)"OF FUEL"
 1830 PROCd(50):FORI%=200TO40 STEP-5:
SOUND1,-15,I%,2:SOUND2,-15,I%+5,2:NEX
T
 1840 COLOUR128
 1850 ENDPROC
 1860 DEFPROCguzzlerwin
 1870 S%=S%+100+SC%*10:SC%=SC%+1
 1880 COLOUR3:PRINTTAB(2,6)"CONGRATUL
ATIONS!" TAB(3,8)"YOU  SAVED THE" TAB
(8,10)"CITY"
 1890 FORI%=20TO63 STEP2:SOUND1,-15,I
%,2:SOUND2,-15,I%*2,2:SOUND3,-15,I%*4
,2:NEXT
 1900 PROCd(100)
 1910 ENDPROC
 1920 DEFPROCinitializeuser
 1930 T$=STRING$(40,CHR$0)
 1940 T$=CHR$132+CHR$157+CHR$141+CHR$
131+"THE SUPER GREEN GLOOP GULPER GAM
E"
 1950 PRINTT$'T$'
 1960 T$=CHR$146+STRING$(39,CHR$243)
 1970 PRINTT$'
 1980 T$=CHR$32+CHR$130
 1990 PRINTT$"THE CITY IS BEING INVAD
ED BY THE"'T$"DREADED CREEPING MUTANT
 GREEN GLOOP."
 2000 PRINTT$"IT'S UP TO YOU TO SAVE
IT BY GULPING"'T$"THE GLOOP WITH YOUR
 TRUSTY GLOOP"'T$"GUZZLER BEFORE THE
GLOOP GULPS YOU !"''
 2010 PRINTT$"YOU USE THE CURSOR KEYS
 TO STEER"'T$"YOUR GUZZLER. POINTS AR
E AWARDED FOR"'T$"GLOOP GULPED AND CI
TIES CLEARED."
 2020 PRINTT$"GLOOP GUZZLING USES ENE
RGY SO YOU"'T$"MUST COMPLETE YOUR MIS
SION BEFORE"'T$"YOUR FUEL RUNS OUT."
 2030 T$=CHR$146+STRING$(39,CHR$243)
 2040 PRINT''T$;
 2050 PRINT'TAB(20)CHR$130"RETURN TO
START ";
 2060 REPEATUNTILINKEY(10)=TRUE
 2070 REPEATUNTILGET=13
 2080 ENDPROC
```

*This listing is included in this month's cassette tape offer. See order form on Page 199.*

# Leigh Computer Systems

**Authorised Acorn Service Centre. ACT and Ferranti Computer Dealer**

## COMPUTERS

| | |
|---|---|
| BBC B | £319.00 |
| BBC B + DFS | £389.00 |
| Advance 86B | £699.00 |
| Ferranti 860 | POA |
| ACT | POA |
| Olivetti (M24, etc) | POA |
| Sperry Range | POA |
| North Star Multi User | POA |

## DISC DRIVES

| OPUS | CUMANA | Inc. VAT £ |
|---|---|---|
| 5400 | CSXL100 | 89.95 |
| 5401 | CSX100 | 99.95 |
| 5402 | CSX200D | 119.95 |
| 5802 | CSX400S | 139.95 |
| 5401SD | CS100 | 124.00 |
| 5402SD | CS200D | 149.00 |
| 5802SD | CS400 | 169.00 |
| 5401D | CD200 | 239.00 |
| 5402D | CD400D | 285.00 |
| **5802D £295** | **CD800S** | **315.00** |

## PRINTERS

| | |
|---|---|
| Mannesman Tally MT80 | £199.00 |
| Epson LX80 + Tractor | £249.00 |
| Epson FX80 | £369.00 |
| Epson MX100 | £419.00 |
| Epson FX100 | £485.00 |
| Epson JX80 | £516.00 |
| Epson LQ 1500 | £1019.00 |
| Canon 1080A | £279.00 |
| Canon 1156A | £379.00 |
| Kaga 810 | £269.00 |
| Kaga 910 | £369.00 |

## DAISYWHEELS

| | |
|---|---|
| Epson DX100 | £379.00 |
| Juki 6000 | £209.00 |
| Juki 6100 | £369.00 |
| Juki 6300 | £899.00 |
| Silver Reed 400 | £316.00 |
| Silver Reed 500 | £373.00 |
| Silver Reed 550 | £574.00 |
| Silver Reed 770 | £834.00 |
| Cut Sheet Feeder for 550 or 770 | £240.00 |
| Listing Paper (2000 sheets) | £15.00 |

**● PRINTERS NOT LISTED – PHONE ●**

## MONITORS

| | |
|---|---|
| Microvitec 1431 | £189.00 |
| Microvitec 1451 | £279.00 |
| Microvitec 1441 | £399.00 |
| Philips 7502 green | £84.00 |
| Philips 7522 amber | £89.00 |

## ROMS

| | |
|---|---|
| Accelerator | £59.95 |
| Intersheet | £52.00 |
| Speech ROM | £29.95 |
| Wordwise+ | £52.00 |
| Printmaster | £31.00 |
| Disc Doctor | £31.00 |
| Graphics | £31.00 |

Beebugsoft range available

## ADD-ONS

| | |
|---|---|
| DFS Kit | £85.00 |
| Opus DDFS | £65.00 |
| Cumana DDFS | £65.00 |
| HCR Programmer | £57.00 |
| AMX Mouse | £79.00 |

## EPROMS

| | |
|---|---|
| 27128 | £4.50 |
| 2764 | £2.95 |
| 8271 | £49.00 |

***EDUCATIONAL ORDERS SUPPLIED***

– Price list available on application –

P&P **80p** small items. **£7** large items

**All Prices include VAT**

**75 CROSS STREET**
**SALE**
**MANCHESTER**
**Telephone: 061-905 2144**

**7 COVENTRY ROAD**
**HINCKLEY**
**LEICS.**
**Telephone: 0455 612139**

---

# COMLEX

**Unit 7, Fife St., Nuneaton, Warks. CV11 5PR.**
**Tel: 0203 371371**
Mon-Fri 9am-5.30pm.

## COMPUTERS

| | |
|---|---|
| BBC B | £309.00 |
| BBC B + DFS | £379.00 |
| BBC B + Opus Cumana DFS | £369.00 |
| Advance 86B 128k | £699.00 |
| Advance 86B 256k | £699.00 |
| Ferranti 860 256k | £1265.00 |
| Ferranti 860XT 256k | £2075.00 |
| Ferranti 860XT20 256k | £2649.00 |

Sperry – complete range
Olivetti – complete range
At great cash & carry prices

## DISC DRIVES

| OPUS | CUMANA | |
|---|---|---|
| 5400 | CSXL100 | £84.00 |
| 5401 | CSX100 | £94.00 |
| 5402 | CSX200D | £117.00 |
| 5802 | CSX400 | £129.00 |
| 5401SD | CS100 | £115.00 |
| 5402SD | CS200D | £139.00 |
| 5802SD | CS400 | £157.00 |
| 5401D | CD200 | £217.00 |
| 5402D | CD400D | £277.00 |
| 5802D | CD800S | £282.00 |

| | |
|---|---|
| DFS Kit | £74.00 |
| Opus DDFS | £65.00 |
| Cumana DDFS | £65.00 |
| Acorn Plus III (+ 10 disks) | £219.00 |

## MONITORS

| | |
|---|---|
| Microvitec 1431 | £189.00 |
| Microvitec 1451 | £279.00 |
| Microvitec 1441 | £399.00 |
| Philips 7502 green | £79.00 |
| Philips 7522 amber | £85.00 |

## EPROMS

| | |
|---|---|
| 27128 | £3.95 |
| 2764 | £2.85 |
| 8271 | £44.00 |

## MODEMS

| | |
|---|---|
| Pace (with Commstar) | £149.00 |
| WS2000 | POA |
| AMX Mouse | £74.95 |

## PRINTERS

| | |
|---|---|
| Mannesman Tally MT80 | £199.00 |
| Epson LX80 + tractor | £249.00 |
| Epson FX80 | £375.00 |
| Epson MX100 | £420.00 |
| Epson FX100 | £487.00 |
| Epson JX80 | £516.00 |
| Epson LQ1500 | £1019.00 |
| Star SG10 | £289.00 |
| Kaga 810 | £269.00 |
| Kaga 910 | £369.00 |
| Cannon 1080A | £279.00 |
| Cannon 1156A | £379.00 |

## DAISYWHEEL

| | |
|---|---|
| Juki 6000 | £209.00 |
| Juki 6100 | £359.00 |
| Juki 6300 | £899.00 |
| Epson DX100 | £379.00 |
| Silver Reed 400 | £316.00 |
| Silver Reed 500 | £373.00 |
| Silver Reed 550 | £574.00 |
| Silver Reed 770 | £834.00 |
| Cut Sheet Feeder for 550 and 770 | £240.00 |
| Listing Paper (2000 sheets) | £15.00 |

**• PHONE IF PRINTER NOT LISTED •**

## SOFTWARE

| | |
|---|---|
| View | £49.95 |
| Viewsheet | £49.95 |
| Viewstore | £57.49 |
| Accelerator | £59.95 |
| Intersheet | £49.95 |
| Speech ROM | £29.95 |
| Wordwise | £35.95 |
| Wordwise+ | £47.95 |
| Print Master | £27.50 |
| Disc Doctor | £27.50 |
| Graphics | £27.50 |
| Iso Pascal | £62.00 |
| Logo | £62.00 |
| View Printer Driver/Generator | £11.00 |
| HiView | £52.00 |
| UltraCalc II | £72.00 |
| Clares BROM | £31.50 |
| Clares Betabase | £24.00 |
| Clares Replica | £12.00 |
| Exmon II B/E | £26.95 |
| Toolkit B/E | £24.95 |
| Spellcheck II 40/80 | £28.95 |
| Sleuth | £26.95 |
| MuRom | £26.25 |
| Help | £22.50 |

NOW ALSO AT: **14 Holmefield, Off Hope Road,**
**Sale, Manchester**
**Tel: 061-976 3763**

**CALLERS BY APPOINTMENT ONLY**

**ALL PRICES INCLUDE VAT + DELIVERY**

# ENET-THE BBC HARD DISC NETWORK

- ★ **Portable tapestreamer back-up**
- ★ **Acorn Z80/6502/Bitstik compatible**
- ★ **No second processor required for fileserver**
- ★ **Easy, economic, expansions from 10 to 650 megabytes**
- ★ **Superb educational features**
- ★ **Easy to use – ICON driven fileserver**
- ★ **Reliability and security tried and tested with hundreds of users for over two years**
- ★ **User Group for help and hints**

*Please phone or write for details NOW!*

Amcom

**Amcom Software Limited**
**35 Carters Lane,**
**Kiln Farm, Milton Keynes MK11 3HL**
**Tel: (0908) 569212**

---

# FREE

**Available by M/Order (p+p free)**
**Send Cheques or Postal Orders to:**

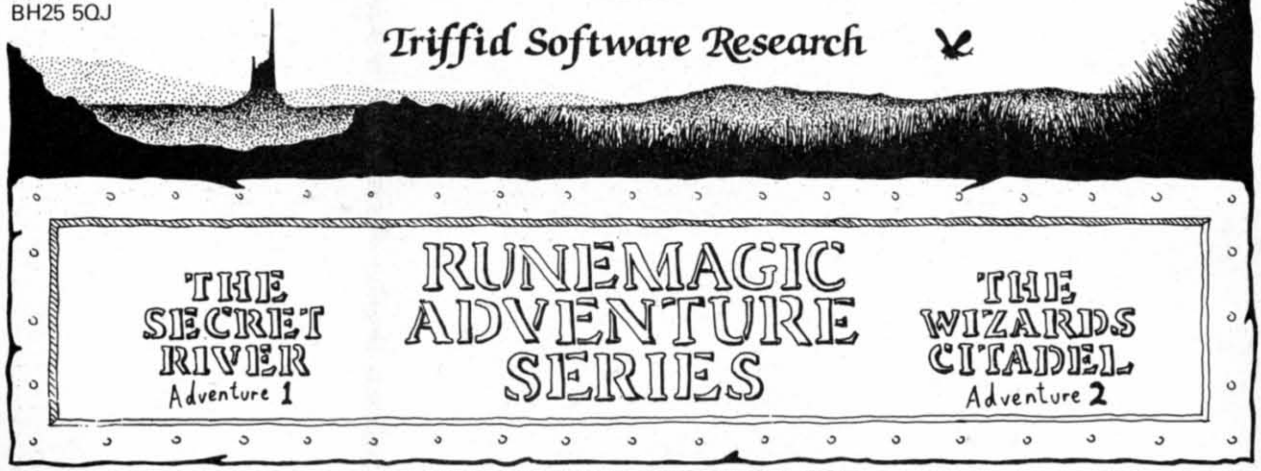
**Triffid Software Research**

12 Cullwood Lane
Ashley
New Milton
Hampshire
BH25 5QJ

**BBC–B**
**versions**
**£6.95**
**for**
**Both**

BUY
ADVENTURE 1
AND GET
ADVENTURE 2
ABSOLUTELY
FREE

*Triffid Software Research*



**HURRY WHILE STOCKS LAST**
**ADVENTURE 3 COMING SOON**
**Send your software to us. If accepted, generous royalties offered.**

## From Page 85

```
+CHR$byte%
  620 char%=char%+1
  630 UNTIL byte%=255
  640 NEXT
  650 total%=FNtotal
  660 *FX200
  670 CLS
  680 ENDPROC
  690 DEFPROCget_new defs
  700 LOCALf_key%,key code%,X%,space%
,k$
  710 VDU22,6
  720 VDU19,0,back%:0;19,1,fore%;0;
  730 PROCwindow(2):PROCcolour(0,1):C
LS
  740 PRINTTAB(0,6)"TAB for menu":
  750 *FX220,9
  760 PROCprint defs
  770 REPEAT
  780 PROCwindow(.)
  790 key_code%=FNkey_code
  800 f_key%=key code%-200
  810 PROCcolour(0,1):CLS
  820 PROCshift ctrl(f_key%):PRINT" -
 type definition."
  830 PRINT'''"Press ";:PROCshift_ctr
l(f_key%):PRINT" again when complete.
"''"Escape to leave unchanged.";
  840 VDU13,11,11,11,11:PROCcolour(1,
0):PRINT">>";:PROCcolour(0,1):PRINT"
";
  850 k$="":space%=max%-total%+LENkey
$(f_key%)
  860 *FX229,1
  870 REPEAT
  880 REPEAT
  890 X%=GET
  900 IF (LENk$=31 OR LENk$>space%) A
ND X%<>127 AND X%<>key_code% AND X%<>
27 VDU7
  910 UNTIL (LENk$<31 AND LENk$<=spac
e%) OR X%=127 OR X%=key code% OR X%=2
7
  920 IF X%<>27 k$=FNbuild_up(k$,X%)
  930 UNTIL X%=key_code% OR X%=27
  940 *FX21 7
  950 IF X%<>27 CLS:total%=total%-LEN
key$(f_key%):key$(f_key%)=k$:total%=t
otal%+LENkey$(f_key%):PROCcolour(1,0)
:PROCwindow(1):PROCdefinition(f_key%)
  960 *FX229
  970 UNTIL FALSE
  980 ENDPROC
  990 DEFFNkey_code
 1000 LOCALK%
 1010 REPEAT
 1020 REPEAT
 1030 PROCcolour(0,1):CLS
 1040 PRINT'"Press the ";:IF shift% P
RINT"shift"; ELSE PRINT"ctrl";
 1050 PRINT" function key"''"which you
 want to define."
 1060 PRINT'"Escape for ";:IF shift%
PRINT"ctrl"; ELSE PRINT"shift";
 1070 PRINT" keys."
 1080 PRINT'"TAB for menu.";
 1090 *FX21 0
 1100 K%=GET
 1110 CLS
 1120 IF K%=27 THEN shift%=NOT shift%
:PROCprint_defs:PROCwindow(2)
 1130 UNTIL (K%>=200 AND K%<=215 AND
shift%) OR (K%>=216 AND K%<=231 AND N
OT shift%)
 1140 IF key$(K%-200)=lock$ VDU7
 1150 UNTIL key$(K%-200)<>lock$
 1160 =K%
 1170 DEFPROCshift_ctrl(K%)
 1180 IF K%<16 PRINT"Shift f-";K%; EL
SE PRINT"Ctrl f-";K%-16;
 1190 ENDPROC
 1200 DEFFNbuild_up(k$,X%)
 1210 IF (X%>=32 AND X%<127) OR X%=13
 k$=k$+CHR$X%:IF X%<>13 VDUX% ELSE IF
 X%=13:PROCcolour(1,0):PRINT"R";:PROC
colour(0,1)
 1220 IF X%=1 OR X%=4 OR X%=19 k$=k$+
CHR$X%:PROCcolour(1,0):PRINTCHR$(X%+6
4);:PROCcolour(0,1)
 1230 IF X%=127 AND LENk$>0 k$=LEFT$(
k$,LENk$-1):VDUX%
 1240 IF X%>=128 AND X%<=137 k$=k$+CH
R$X%:PROCcolour(1,0):PRINT;X%-128;:PR
OCcolour(0,1)
 1250 IF X%=9 k$=k$+CHR$9:PROCcolour(
1,0):PRINT"T";:PROCcolour(0,1)
 1260 IF X%>=140 AND X%<=143:PROCcolo
ur(1,0):PRINTCHR$(240+X%-140);:k$=k$+
CHR$X%:PROCcolour(0,1)
 1270 IF X%>=212 AND X%<=215 PROCcolo
ur(1,0):PRINTCHR$(244+X%-212);:k$=k$+
CHR$(X%-56):PROCcolour(0,1)
 1280 IF X%>=228 AND X%<=231 PROCcolo
ur(1,0):PRINTCHR$(248+X%-228);:k$=k$+
CHR$(X%-56):PROCcolour(0,1)
 1290 =k$
 1300 DEFPROCprint_defs
 1310 LOCALN%,start%
 1320 PROCwindow(1):PROCcolour(1,0):C
LS
 1330 IF shift% start%=0 ELSE start%=
16
 1340 PROCcolour(0,1):IF shift% PRINT
" Shift f-keys " ELSE PRINT" Ctrl f-k
eys "
 1350 PRINT
 1360 PROCcolour(1,0)
 1370 FOR N%=start% TO start%+11
 1380 IF start%=0 PRINTN%". "; ELSE P
RINTN%-16". ";
 1390 PROCdefinition(N%)
 1400 NEXT
 1410 ENDPROC
 1420 DEFPROCdefinition(N%)
 1430 LOCAL L%
 1440 IF shift% L%=N% ELSE L%=N%-16
 1450 PRINTTAB(5,2+L%)SPC(35);:PRINTT
AB(5,2+L%);
 1460 IF key$(N%)<>lock$ PROCprint_st
ring(key$(N%)) ELSE PRINT"Not availab
le"
 1470 ENDPROC
 1480 DEFPROCsave_code(code)
 1490 LOCALf$,Q$,ok%
 1500 PROCwindow(2)
 1510 REPEAT:ok%=TRUE:CLS
 1520 PRINTCHR$131;:INPUTLINE"Save wi
th what file name? "f$
 1530 IF FNfiling_system=4 THEN IF FN
file_exists(f$) PRINT'CHR$7CHR$134"Fi
le exists....overwrite?":Q$=GET$:IF I
NSTR("Nn",Q$)<>0 ok%=FALSE
 1540 UNTIL ok%
 1550 CLS
 1560 PRINT'CHR$131"Saving code....."
;
 1570 IF FNfiling_system=4 THEN IF FN
file_exists(f$):PROCoscli("ACCESS "+f
$)
 1580 PROCoscli("SAVE "+f$+" "+STR$~c
ode+" "+STR$~P%+" "+STR$~init)
 1590 IF FNfiling_system=4 THEN PROCo
scli("ACCESS "+f$+" L")
 1600 ENDPROC
 1610 DEFPROCprint_string(S$)
 1620 LOCALN%,X$
 1630 FOR N%=1 TO LENS$
 1640 X$=MID$(S$,N%,1)
 1650 IF ASCX$>=32 AND ASCX$<128 PRIN
TX$;
 1660 IF ASCX$=13 PROCcolour(0,1):PRI
NT"R";:PROCcolour(1,0)
 1670 IF ASCX$>=128 AND ASCX$<=139 PR
OCcolour(0,1):PRINT;ASCX$-128;:PROCco
lour(1,0)
 1680 IF ASCX$=1 OR ASCX$=4 OR ASCX$=
19 k$=k$+CHR$X%:PROCcolour(0,1):PRINT
CHR$((ASCX$)+64);:PROCcolour(1,0)
 1690 IF ASCX$=9 PROCcolour(0,1):PRIN
T"T";:PROCcolour(1,0)
 1700 IF ASCX$>=140 AND ASCX$<=143 PR
OCcolour(0,1):PRINTCHR$(240+ASCX$-140
);:PROCcolour(1,0)
 1710 IF ASCX$>=156 AND ASCX$<=159 PR
OCcolour(0,1):PRINTCHR$(244+ASCX$-156
);:PROCcolour(1,0)
 1720 IF ASCX$>=172 AND ASCX$<=175 PR
OCcolour(0,1):PRINTCHR$(248+ASCX$-172
);:PROCcolour(1,0)
 1730 NEXT
 1740 PRINT
 1750 ENDPROC
 1760 DEFPROClock
 1770 LOCAL N%
 1780 key$(10)=lock$:key$(26)=lock$
 1790 FOR N%=12 TO 15
 1800 key$(N%)=lock$
 1810 key$(N%+16)=lock$
 1820 NEXT
 1830 ENDPROC
 1840 DEFFNtotal
 1850 LOCALT%,N%
 1860 FOR N%=0 TO 31
 1870 IF key$(N%)<>lock$ T%=T%+LENkey
$(N%)
 1880 NEXT
 1890 =T%
 1900 Returns TRUE or FALSE if file e
xists/doesn't exist on disc.
 1910 Not called on tape machines.
 1920 DEFFNfile_exists(F$)
 1930 LOCALX%
 1940 X%=OPENIN F$
 1950 CLOSE#X%
 1960 =NOT(X%=0)
 1970 Returns 1 or 2 if tape,4 if disc
 1980 DEFFNfiling_system
 1990 A%=0:X%=0:Y%=0
 2000 =USR(&FFDA) AND &FF
 2010 DEFFNget
 2020 LOCAL Q%
 2030 Q%=GET
 2040 IF Q%=42:PROCos_command
 2050 =Q%
 2060 DEFPROCos_command
 2070 LOCAL A$,Q%
 2080 PRINT''CHR$130;:INPUT"*"A$
 2090 PROCoscli(A$)
 2100 PRINT'CHR$134"Hit a key";
 2110 Q%=FNget
 2120 ENDPROC
 2130 DEFPROCoscli(A$)
 2140 LOCAL Q%
 2150 X%=osclibuff% MOD &100:Y%=oscli
buff% DIV &100
 2160 $osclibuff%=A$:CALL&FFF7
 2170 ENDPROC
 2180 DEFPROCwindow(W%)
 2190 IF W%=0 VDU26 ELSE VDU28
 2200 IF W%=1 VDU0,15,39,0
 2210 IF W%=2 VDU0,24,39,16
 2220 ENDPROC
 2230 DEFPROCcolour(F%,B%)
 2240 COLOURF%:COLOUR128+B%
 2250 ENDPROC
 2260 DEFPROCreport:LOCALQ%
 2270 VDU7
 2280 total%=FNtotal
 2290 IF ERR<>17 THEN PRINT':REPORT:P
RINT''CHR$134"Hit a key";:Q%=FNget
 2300 ENDPROC
 2310 DEFPROCinit
 2320 LOCAL N%
 2330 *FX200 1
 2340 @%=3
 2350 DIM key$(31)
 2360 DIM osclibuff% 30
 2370 FOR N%=0 TO 27:key$(N%)=STRING$
(31," "):NEXT
 2380 FOR N%=0 TO 27:key$(N%)="":NEXT
 2390 lock$=CHR$255:PROClock
 2400 *FX4,2
 2410 *FX12 3
 2420 *FX213,150
 2430 *FX225,128
 2440 *FX226,200
 2450 *FX227,216
 2460 VDU23,240,0,16,32,64,255,64,32,
16,23,241,0,8,4,2,255,2,4,8,23,242,16
,16,16,16,146,84,56,16,23,243,16,56,8
4,146,16,16,16,16
 2470 VDU23,244,0,16,36,68,255,68,36,
16,23,245,0,8,36,34,255,34,36,8,23,24
6,16,16,124,16,146,84,56,16,23,247,16
,56,84,146,16,124,16,16
 2480 VDU23,248,0,16,41,73,255,73,41,
16,23,249,0,8,148,146,255,146,148,8,2
3,250,124,16,16,124,146,84,56,16,23,2
51,16,56,84,146,124,16,16,124
 2490 shift%=TRUE
 2500 *FX200 0
 2510 ENDPROC
 2520 DEFPROCassemble_code(code)
 2530 REM Returns execution address t
o main prog in "init"
 2540 PROCcolour(0,1):PROCwindow(2):C
LS
 2550 PRINT'CHR$131"Assembling code..
...";
 2560 insv=&22A:REM insert character
into buffer vector
 2570 osbyte=&FFF4
 2580 FOR opt%=0 TO 2 STEP 2
 2590 P%=code
 2600 [OPT opt%
 2610 .key_table OPT FNequs(STRING$(7
0,CHR$0))
 2620 .init  \execution address when
first run
 2630 SEI
 2640 LDA insv:STA oldvec   \store ol
d vector contents
2650 LDA insv+1:STA oldvec+1
2660 LDA#intercept MOD &100:STA insv
   \change vector to point to "interc
ept"
 2670 LDA#intercept DIV &100:STA insv
+1
 2680 CLI
 2690 LDA#0
 2700 STA flag
 2710 LDA#134   \read cursor position
 2720 JSR osbyte
 2730 CPY#20  \assume if cursor highe
r up screen than line 20 that we're i
n
 2740 BCC end_init \"Old text?" page
so end initialisation
 2750 LDA#138  \push return into keyb
oard buffer to remove
 2760 LDX#0     \"Press any key" messa
ge
 2770 LDY#13
 2780 JSR osbyte
 2790 .end_init
 2800 RTS
 2810 .oldvec NOP:NOP
 2820 .store NOP
 2830 .flag NOP
 2840 .slock NOP
 2850 .intercept  \insv now points he
re
 2860 STA store  \character passed in
 A, store temporarily
 2870 PHP:PHA:TXA:PHA:TYA:PHA  \prese
rve registers
 2880 LDA flag
 2890 BNE end  \if already acting on
f-key press then end
 2900 CPX#0   \buffer number passed i
n X
 2910 BNE end \no action if not keybo
ard buffer
 2920 LDA store  \restore character
 2930 CMP#144 \shift f0
 2940 BCC end
 2950 LDA#237  \read cursor editing s
tate (X=0 if in menu)
 2960 LDX#0
 2970 LDY#&FF
 2980 JSR osbyte
 2990 CPX#0
 3000 BEQ end      \end if in menu
 3010 LDA#0:STAslock \turn off slock
flag
 3020 LDA store
 3030 \check not shifted cursor keys
 3040 CMP#156
 3050 BCC check_ctrl_cursor
 3060 CMP#160
 3070 BCC end      \end if shifted cur
```

→

## From Page 173

```
sor kev
 3080 .check ctrl cursor
 3090 CMP#172
 3100 BCS end   \end if ctrl cursor k
ev
 3110 CMP#156
 3120 BCSnot shift
 3130 LDA#121
 3140 LDX#80 EOR &80
 3150 JSRosbyte
 3160 CPX#80 EOR &80
 3170 BNEend
 3180 INCslock \flag s-lock on
 3190 LDAstore
 3200 .not shift
 3210 PHA      \store character in A o
n stack
 3220 LDA#1
 3230 STA flag  \set flag
 3240 PLA   \restore character to A (
=f-key character number)
 3250 JSR interpret kev
 3260 LDA#0
 3270 STA flag  \turn off flag
 3280 LDAslock
 3290 BEQnot slock
 3300 LDA#202:LDX#48:LDY#0
 3310 JSRosbyte \turn off shift lock
 3320 .not slock
 3330 PLA:TAY:PLA:TAX:PLA  \restore r
egisters but replace A with 8
 3340 LDA#8   \seems a safe character
 to return to Wordwise
 3350 PLP
 3360 JMP(oldvec)  \exit to old inser
t character routine
 3370 .end
 3380 PLA:TAY:PLA:TAX:PLA:PLP  \resto
re registers if no action to be taken
 3390 JMP (oldvec) \exit to old inser
t character routine
 3400 .interpret key
 3410 SEC     \subtract 144 from f-ke
y character number
 3420 SBC#144 \A now contains f-key n
umber (shift f0=0 to ctrl copy=27)
 3430 ASL A   \each definition pointe
r in key-table is two bytes so multip
ly
 3440         \key number by 2. A now
 contains offset to key's pointer
 3450 TAX     \transfer A to X
 3460 LDA key table,X
 3470 STA pointer+1 \store address of
 definition in "pointer"
 3480 INX
 3490 LDA key table,X
 3500 STA pointer+2
 3510 LDY#0
 3520 .key loop
 3530 .pointer LDA&AAAA,Y \operand wi
ll be altered by the program. Avoids
need
 3540                        \to use any
 zero page locations
 3550 CMP#255  \all definitions end w
ith 255
 3560 BEQ end key loop \so if 255 end
 3570 TAX    \temporarily store charac
ter in X
 3580 TYA    \store loop counter on st
ack
 3590 PHA
 3600 TXA    \restore character to A
 3610 TAY    \and transfer to Y
 3620 LDA#138
 3630 LDX#0
 3640 JSR osbyte     \push character i
nto keyboard buffer
 3650 PLA            \restore and incre
ase loop pointer
 3660 TAY
 3670 INY
 3680 JMP key loop
 3690 .end key loop
 3700 RTS
 3710 \f key definitions
 3720 .s0:OPT FNfkey(0,s0,key$(0))
 3730 .s1:OPT FNfkey(1,s1,key$(1))
 3740 .s2:OPT FNfkey(2,s2,key$(2))
 3750 .s3:OPT FNfkey(3,s3,key$(3))
 3760 .s4:OPT FNfkey(4,s4,key$(4))
 3770 .s5:OPT FNfkey(5,s5,key$(5))
 3780 .s6:OPT FNfkey(6,s6,key$(6))
 3790 .s7:OPT FNfkey(7,s7,key$(7))
 3800 .s8:OPT FNfkey(8,s8,key$(8))
 3810 .s9:OPT FNfkey(9,s9,key$(9))
 3820 .s10:OPT FNfkey(10,s10,"")  \br
eak
 3830 .s11:OPT FNfkey(11,s11,key$(11)
)
 3840 .s12:OPT FNfkey(12,s12,"") \cur
sor key
 3850 .s13:OPT FNfkey(13,s13,"") \cur
sor key
 3860 .s14:OPT FNfkey(14,s14,"") \cur
sor key
 3870 .s15:OPT FNfkey(15,s15,"")\ cur
sor key
 3880 .c0:OPT FNfkey(16,c0,key$(16))
 3890 .c1:OPT FNfkey(17,c1,key$(17))
 3900 .c2:OPT FNfkey(18,c2,key$(18))
 3910 .c3:OPT FNfkey(19,c3,key$(19))
 3920 .c4:OPT FNfkey(20,c4,key$(20))
 3930 .c5:OPT FNfkey(21,c5,key$(21))
 3940 .c6:OPT FNfkey(22,c6,key$(22))
 3950 .c7:OPT FNfkey(23,c7,key$(23))
 3960 .c8:OPT FNfkey(24,c8,key$(24))
 3970 .c9:OPT FNfkey(25,c9,key$(25))
 3980 .c10:OPT FNfkey(26,c10,"") \bre
ak
 3990 .c11:OPT FNfkey(27,c11,key$(27)
)
 4000 ]
 4010 NEXT
 4020 ENDPROC
 4030 DEFFNequs(A$)
 4040 $P%=A$+CHR$255:P%=P%+1+LENA$
 4050 =opt%
 4060 DEFFNfkey(key,addr,A$):REM stor
es address of key's definition in tab
le
 4070 LOCALdummy%
 4080 dummy%=FNequs(A$)
 4090 !(key table+2*key)=addr
 4100 =opt%
 4110 DEFPROCmove prog(from,to)
 4120 REM Assembles code at &A00 to m
ove program up in memory.
 4130 length=&70:oldpage=&72:newpage=
&74
 4140 !length=TOP-PAGE
 4150 !oldpage=from:!newpage=to
 4160 osbyte=&FFF4
 4170 move=&A00
 4180 FOR I%=0 TO 2 STEP2:P%=move
 4190 [OPT I%
 4200 LDA oldpage:CLC:ADClength:STA o
ldpage:LDAoldpage+1:ADClength+1:STA o
ldpage+1:DEColdpage+1:LDAnewpage:CLC:
ADClength:STAnewpage:LDAnewpage+1:ADC
length+1:STAnewpage+1:DECnewpage+1:LD
Y#&FF:LDXlength+1:BEQloloop
 4210 .loop1:LDA(oldpage),Y:STA(newpa
ge),Y:DEY:CPY#&FF:BNEloop1:DEColdpage
+1:DECnewpage+1:DEX:BNEloop1
 4220 .loloop:LDXlength:BEQrun:.loop2
:LDA(oldpage),Y:STA(newpage),Y:DEY:DE
X:BNEloop2
 4230 .run:LDX#0:.runloop:TXA:PHA:LDA
runtext,X:CMP#&FF:BEQend:TAY:LDA#138:
LDX#0:JSRosbyte:PLA:TAX:INX:JMPrunloo
p
 4240 .end:PLA:RTS
 4250 .runtext
 4260 ]
 4270 $runtext=CHR$23+CHR$0+CHR$1+STR
ING$(7,CHR$0)+"PAGE="+STR$to+CHR$13+"
END"+CHR$13+"RUN"+CHR$13+CHR$255
 4280 P%=P%+1+LEN$runtext
 4290 NEXT
 4300 CALLmove
 4310 ENDPROC
```

*This listing is included in this month's cassette tape offer. See order form on Page 199.*

# Economy coding for split screens

*INSPIRED by Martin Millan's program to provide split screens for program editing (October Micro User), but discouraged by the length of the code, I have devised the following key definitions which perform a similar function.*

*Four lines of code cannot perform as sophisticated a task as a long program, but I believe that these key definitions come a close second and use some 6,000 bytes less memory.*

*This memory saving is made up of 2000 from the program and 4000 from using a less greedy screen mode.*

*Key 0 is defined to enter Mode 3 which, of course, automatically clears the screen.*

*Key 1 is programmed with the equivalent of VDU28,0,24,39,0 ¦MCLS¦M. This sets up a window on the left hand side of the screen.*

*Key 2 is programmed with the equivalent of VDU28,40,24,79,0 ¦MCLS¦M. This sets up a screen on the right hand side of the screen.*

*Key 3 is programmed with the equivalent of VDU28,0,24,79,0 ¦M. This sets the whole screen as one window without clearing the text.*

*The actual program to accomplish this is:*

```
10 *KEY0MODE3¦M
20 *KEY1¦\¦@¦X'¦@¦L
30 *KEY2¦\(¦X0¦@¦L
40 *KEY3¦\¦@¦X0¦@
```

*The reason for entering simple VDU commands in such an obscure form is to avoid printing to the screen, thus saving one screen line.*

*Additionally some three lines are saved at the top of the screen by not displaying the key definitions. The net result is an effective screen length equal to the actual length (25 rows).*

*This should be compared with the effective length of 28 which can be achieved using Mode 0.* – **David J. Price, Sevenoaks.**

## Justified Printing

*JOHN Stattaford's confusion ("Secret Coding" letter in the September Micro User) results from his belief that the Epson FX80 printer supports microspacing. It doesn't!*

*Microspacing is used when text is to be justified. Non-justified text is aligned at the left hand margin, but the right hand margin is ragged, due to the fact that there will in general be a difference in line lengths.*

*Justification is achieved by inserting additional blanks between words, using as many blanks as are necessary to cause the right hand end of each line to reach exactly to the position of the right hand margin.*

*These blanks are normally distributed in some random way among the word gaps in the line. This is what View does for its screen display when justification is selected.*

*It is also what is achieved in printing when the printer does not support micro-spacing.*

*The problem with this scheme is that the result can look uneven, since some words will be separated by single spaces and others may be separated by two or more spaces.*

*Micro-spacing allows a more even distribution of the added spaces, by allowing inter-word spacings which are not necessarily integral numbers of standard-width space characters.*

*This facility is not supported by the Epson FX80 printer, though it could no doubt be emulated by means of the bit-image mode, but certainly not via the Acornsoft Printer Driver.*

*It is worth noting that although the Epson FX80 supports proportional mode printing, where each character occupies a width which is related to the size of the character rather than being the same width for each character, as is otherwise the case, justified printing cannot be achieved in this mode, since neither View nor the Printer Driver "knows" the printed width of each character.*

*The result would be a ragged right hand margin again, though with a different raggedness.* – **A.E. Mounter, Old Harlow.**

* * *

*WITH reference to John D. Stattaford's query in the September issue.*

*We are a producer of special education programmes mainly for the mentally handicapped, in the main on the BBC but also for the Electron and in some cases the Spectrum. Apart from these programmes we also provide tuition in word processing to the RSA syllabus.*

*We eventually became so disillusioned with all the printer drivers which we have so far encountered that in order to get proportional text, with a justified right margin, without varying length gaps, we have now produced our own, micro-spacing driver.*

*If readers having specialised problems will write to us, we will endeavour to provide personalised drivers with micro-spacing on even proportional text.* – **David J. Regan, New Horizon Computer Services, Plymouth.**

## B+ goes marching on

*I WAS interested but a trifle confused to read Cook's Tour on the future of the BBC B.*

*It is always of interest to read a projection into the future of the status of an expensive machine like the BBC.*

*The confusion arose, however, when Mike Cook predicted in the closing lines of his article that it was likely to be around for a good few years yet.*

*For Beebug (June) has announced: "Acorn has stopped manufacturing the Model B . . .*

*"Considering that mentioning the Atom is likely to produce blank looks in many a computer club, and that the model A gets short shrift in the media, are we to anticipate the beginning of the end for the Model B?"*

*A further query about this issue of obsolescence was posed recently in the pages of The Guardian.*

*A journalist there, one presumably well informed, suggested that the wise 8-bit owner should consider getting rid of his machine since 1986 would see the advent of 16-bit technology and a massive turnover of existing machines in consequence.*

*Shouldn't we be told?* – **Trevor M. Artingstall, Romford.**

● The BBC Micro is a superb machine and its unique design gives it a versatility that other, lesser, computers lack. It will be around for years, and the B+ marches on.

The 16 v 8 bit argument tends to be an amazingly uninformed debate more to do with fashion than with fact.

Certainly many computer owners will want the extra power that 16 bits can provide. However, that depends on whether the manufacturers can exploit the full potential of those extra 8 bits.

Recent computer history shows that this isn't always the case.

## Picture tidy

*DOODLING on the AMX Mouse Art package thinking of something original to draw other than chads, I hit on the idea of a program that would take a finished picture, remove all information around the sides, like pattern and icon boxes, and reposition the picture in the*

→

### From Page 175

*middle of the screen save with a new file name ready for use in your own programs. Ideal for logos.*

*This is my program:*

```
   10MODE 4:*DESK
   20VDU19,0,0;0;19,1,7;0;
   30GCOL 0,0
   40MOVE120,152:MOVE1159,1
52
   50PLOT85,120,903:PLOT85,
1159,903
   60*LOAD OLDFILE 3000
   70FOR Y=13256 TO 20296 S
TEP 320
   80FOR X=Y TO Y+255
   90?(X+10584)=255-?X
  100NEXT X,Y
  110REPEAT VDU7:K$=INKEY$(
100):UNTILK$=" "
  120*SAVE NEWFILE 5800 800
0
```

*You should alter the file names in lines 60 and 120 to suit your needs.*

*Disc users will benefit more than cassette users from the almost instant loading, but theres no reason why cassette users can't take advantage of this utility, remembering to use the *OPT1,0 command at the start of the program to stop cassette filing information.* – **David Browne, Bognor Regis.**

## Putting the clock right

*WITH reference to your Clock program in the July issue, how can I make the displayed time appear one line lower?*

*As a user of Wordwise Plus, the position of the clock conflicts with "characters free" and the "insert", "overwrite" and the marker displays.*

*Placing the clock display one line lower would put it in a clear area.* – **R.K.P. Neep, Cheltenham.**

● You can drop the display one line by altering line 350 to:

```
350 LDY #79: LDX #12
```

## Error handling

*CHRIS Bowerman's article on error handling was very interesting, but his Program III to return error messages will not always work in the way intended.*

*This is through no fault of his program, but because of the way some error messages are stored in the BBC Basic I (and probably II) ROM.*

*Take, for example, the error message "Bad DIM" (ERR=10). In Basic I this is stored at &90D5, as shown below. The word DIM, though, is not stored as D, I, M, but, presumably to save on memory, as 222, which is its token.*

```
&90D5      0     BRK
&90D6     10     Error number
&90D7     66     B
&90D8     97     a
&90D9    100     d
&90DA     32
&90DB    222     Token for DIM
&90DC      0     Message terminator
```

*As a rule any Basic error message that has any Basic word in it will have that word stored as a token. On Basic I these error messages are:*

*No FN, Bad DIM, DIM space, Not LOCAL, No PROC, (Surprisingly Log range and Exp range are stored in full on Basic I), Bad MODE, No such FN/PROC, No FOR, Can't Match FOR, FOR variable, Too many FORs, No TO, Too many GOSUBs, No GOSUB, ON syntax, ON range, Out of DATA, No REPEAT, Too many REPEATs.*

*LINE space and RENUMBER space are also "semi-tokenised".*

*The word that is tokenised, that is DATA in "Out of DATA", will always be printed in capitals.*

*I hope that this clears up any problems that people are having in this field.* – **Simon Spruzen, Milton Keynes.**

## Further to elegance

*I NOTICED a letter from R.H. Chotalia – "How not to fall on the dec" – in the July issue and am sure everyone will agree that his recursive solution is elegant to say the least.*

*I should like to try to improve on his efforts with the following smaller function:*

```
 80 DEFFNhex(nn%)
 90 len%=LEN(STR$~(nn%)):le
n%=len%+len% MOD 2
100 =RIGHT$(STRING$(len%,"0
")+STR$~(nn%),len%)
```

*By way of explanation:*

*Line 90: Calculate length of hex string obtained using STR$ built-in function with a hexadecimal argument. Add 'len% MOD 2' to make an odd length even.*

*Line 100: Create a temporary string of zeros followed by the hex value we wish to print, and use the rightmost characters only.*

*The above explanation is perhaps more easily illustrated by a simpler example. Suppose we always want a field length of 4. The function then becomes a one-liner.*

```
80 DEFFNhex4(nn%):=RIGHT$("
000"+STR$~(nn%),4)
```

*The same idea can be used for decimal values which need to be displayed with leading zeros. Just omit the ~ signs.*

*Thanks for a great magazine.* – **Stefan W. Neuman, Bristol.**

# Corrupted in the Tube

*I WAS interested to read of the problems experienced by J.S. Ridler (June issue) with his 6502 second processor.*

*I have encountered similar problems and may perhaps be able to shed a little light on the matter.*

*When I acquired Lisp on cassette I could never progress further than the middle of the leader program.*

*Repeated attempts always produced "No such variable . . ." with the second processor attached but not switched on. The suite of programs loaded without problem when the second processor was removed and also when attached and enabled.*

*The explanation from Acorn is interesting if a little strange. Apparently the second processor takes some power from the I/O processor even when it is switched off!*

*In my case having a densely populated ROM board proves too great a power drain and this is the cause of the problems I have encountered.*

*When switched on, the second processor's own power supply (in theory) supplies sufficient power to avoid any undue load being placed upon the I/O processor.*

*Up to a point this explanation seems to deal with my own particular circumstances. However, I still suffer from unnerving "glitches" – graph plots going badly awry, multiple copy cursors, and so on.*

*It would appear that VDU queues are corrupted in negotiating the Tube.*

*Since the I/O processor appears to function correctly and supports the ROM board with no apparent problem, I am at a loss to explain my continued difficulties.*

*I would be grateful for any suggestions.* – **W.J. Birtwistle, Blackpool.**

● The BBC is not designed to power a ROM board full of eproms.

Adding a second processor only increases the strain on the power supply.

We know of no power supply upgrade to solve your problem.

It is interesting to notice that on the B+, Acorn proclaim they have buffered the Tube . . .

## Wordwise training

*WE have recently taken delivery of Wordwise for the BBC Micro and are having great difficulty in* *locating a venue for a training course on this machine.*

*Can you please assist us by advising us of a college in our area which does in fact run a training course?* – **Mrs B. Berry, Administration Officer, National London.**

- We haven't heard of any college enterprising enough to run a Wordwise course. It might be worth contacting Paul Beverley of Norwich Computer Services, 6 Upper King Street, Norwich NR3 7HA.

He has written several excellent books on Wordwise and, as an ex-lecturer, he might be able to put on courses if there is sufficient interest.

## Wrong line

*I AM one of Alice's most avid fans and regularly type in his mini adventures even though I rarely manage to come up with a solution to most of them.*

*I normally don't have many problems with the listings, probably because they're quite short and within my ability to check for typing mistakes.*

*I have however come across a snag with Lac Dracula from the October issue, and it appears to be in the first line. The program seems to have been written so that under certain circumstances it generates an error designed to kill you. But the ON ERROR command is directed to the wrong line. Am I right or have I missed something?* – **Peter Gornall, Shrewsbury.**

- Thanks for your letter. You are quite right, a typing error was made in line 10 as we translated Alice's program to the BBC Micro. It should as you so rightly point out have line 10 as:

```
10 ON ERROR GOTO 140
```

# One for the engineers

*I REFER to the letter from D.S.T. Raubenheimer in the August issue concerning the lack of scientific and technical software, which must strike a chord in many an engineer's heart.*

*When I was a young engineer one of the tasks that arose from time to time was the calculation of what is called a "backwater curve". This is the shape of the water surface upstream from a weir or other obstruction.*

*It was a tedious calculation, and involved the use in those days of what might now be regarded as a grotesque kind of cylindrical slide rule.*

*Using a short program on the BBC Micro such a calculation is now child's play.*

*I enclose a copy of the program, which may interest your correspondent and other engineers (see below).*

*I have written some others, covering weirs, hydraulic pumps and so on, and some of the more useful mathematical routines which I have found useful.*

*If your correspondent would like to get in touch with me I should be happy to let him have copies.* – **Edmund W. Jupp, The Firs, Lympstone, Devon.**

```
   10 REM BACKWATER CURVE
   20 ON ERROR GOTO 300
   30 MODE1:COLOUR1:PRINTTA
B(2,22)"BACKWATER CURVE"
   40 COLOUR2:Z%=3:T%=3
   50 PROCdraw:PROCdata:PRO
Ccalc:END
   60 DEFPROCdraw
   70 MOVE100,100:DRAW1200,
100:PLOT85,100,200:MOVE1100
,105:DRAW1100,200:PLOT85,10
0,120:MOVE100,280:DRAW1100,
230:DRAW1120,225
   80 DRAW1130,215:DRAW1140
,200:DRAW1150,170:MOVE600,1
95:DRAW600,450:MOVE1120,220
:DRAW1120,450:MOVE1120,400:
DRAW600,400
   90 MOVE600,195:DRAW600,4
50:MOVE1120,220:DRAW1120,45
0:MOVE1120,400:DRAW600,400
  100 PRINTTAB(18,25);"d";T
AB(26,18);"X"TAB(18,24);"^"
;TAB(18,26);"v";TAB(19,19);
"<";TAB(34,19);">"
  110 PRINTTAB(25,1);"d";TA
B(33,1);"X"
  120 ENDPROC
  130 DEFPROCdata
  140 COLOUR2:PRINTTAB(0,2)
"ENTER:-":INPUT'"MANNING'S
C'T  "M
  150 INPUT"STREAM WIDTH
"W
  160 INPUT"SLOPE OF BED
"S
  170 INPUT"NORMAL DEPTH
"P
  180 INPUT"DEPTH AT HUMP
"R
  190 ENDPROC
  200 DEFPROCcalc
  205 VDU28,28,18,40,0
  210 r=(R-P)/10:d=P
  220 FOR n=1 TO 10:d=P+n*r
  230 U=M*SQR S*((W*P)/(W+2
*P))^(2/T%):Y=P^2*U^2/9.81
  240 A=(d^T%-Y)/(d^T%-P^T%
):B=(R^T%-Y)/(R^T%-P^T%):C=
4*((d+R)^T%-8*Y)/((d+R)^T%-
(8*P^T%))
  250 X=INT(100*((R-d)*(A+B
+C)/(6+S))+0.5)/100
  260 PRINTTAB(18,Z%)INT(10
0*d)/100 TAB(28,Z%)X
  270 Z%=Z%+1
  280 NEXT
  290 ENDPROC
  300 REPORT:PRINT"  AT LIN
E ";ERL
```

## Easy on the pins

*I HAVE found 28 pin low-profile IC sockets, which can be purchased for less than 70p, very useful for protecting the legs of eproms.*

*My father was over the age of 70 when he became hooked on the BBC Micro and his eyes are not as good as they used to be.*

*For one reason or another he keeps shuffling eproms between sockets and sends me a series of legless chips to mend. At his suggestion I now plug his eproms into extra 28 pin sockets which he can then mutilate at one tenth or one hundredth the cost of damaging some commercial firmware.*

*The dual-in-line row of pins push-pull in/out of the sockets on the main circuit or ROM boards more easily than the rather rigid, springy, eprom pins.*

*My excellent ATPL Sidewise ROM board tends to touch some main circuit board components and voltage leads, making it difficult to press it home securely when fitting.*

*Mike Mahon suggested using these 28 pin sockets to raise the board about one eight of an inch by placing them on the connectors at the two corners of the board.*

*I find this has the added advantage of preventing the round turned-pin legs of the ROM board damaging the sockets on the main board.*

*Similarly I use a zero insertion force (ZIF) socket – about £7.12 from Radio Spares – in one of my ROM board sockets for those eproms I am forever changing.*

*An extra 28 pin socket added to the ZIF socket raises this rather wide component above the circuit board socket sufficiently to allow eproms to be used on the sockets either side.*

*This combination is cheaper than the commercially available "ashtray" alternatives and as convenient, provided the lid of your BBC is not screwed down.* – **Rory McCloy, Royal Infirmary, Manchester.**

- ***Want to write to Micromail? The address is: Micromail, The Micro User, Europa House, 68 Chester Road, Hazel Grove, Stockport SK7 5NY.***

## Othello tourney

*I WAS particularly interested to see Robin Nixon's Othello program in the June edition as I had had for some time an equivalent program for the Hewlett-Packard HP85 computer.*

*Eventually I got around to typing it in – so much more instructive than buying the tape – and decided to arrange a challenge match between the two computers. Best of three games.*

*My daughter, who regularly beats the HP85, and I, who doesn't, both felt that the HP85 was the stronger player.*

*The first game appeared to confirm that impression as the*

➡

### From Page 177

*HP85 gradually took more and more of the board.*

*Frankly, if I had been playing the BBC's game I would have resigned about half-way when the HP85 had 30 squares to the BBC's six, but, being a machine, the BBC played on to what looked like inevitable destruction.*

*But what a fascinating game Othello is . . . Suddenly the HP85 was forced to play in a most dangerous square (7,7) since there was nowhere else it could play.*

*Immediately the BBC went in (8,8) and the HP85 was forced to play in (8,7). The BBC went in (8,1) and took the whole of the bottom row.*

*On three moves – not consecutively – the HP85 couldn't play at all, and before it knew where it was the BBC was in a commanding position and finally came out the winner 41 to 21 – the HP85 counts the counters and ends the game when one player runs out.*

*So, one game to the BBC and they embarked on the second.*

*Being machines, I quite expected them to play exactly the same game again, but not so. It took a quite different turn and was much more even throughout – the HP85 finally coming out the winner by 48 to 15.*

*One game all!*

*It was 11pm, but who could turn them off at this stage? The third game was evenly balanced again, with neither machine taking a commanding position at any time.*

*The game went right to the final square and the result was . . . a tie!*

*So one-and-a-half games each, honour was fully satisfied on both sides and the contestants – and the referee – went happily to bed.*

*Actually Robin Nixon's program takes a slight advantage by insisting that its opponent starts first. Luckily the HP85 program will allow either player to start – and will play parallel as well as diagonal openings.*

*It is also distinctly more opponent-friendly in that it never takes more than 15 seconds for a move compared with 90 seconds by the BBC.*

*Incidentally there is a nice little bug in Robin Nixon's program.*

*If one player wipes the other off the board – it can happen – then PROCcount calls PROCgameover which calls PROCcount which calls PROCgameover which calls . . . with very noisy results. Why must everyone write their sound statements at level –15?*

*If you press Escape, you know what that does, don't you? That's right – it calls PROCgameover.*

*Thank you Robin Nixon and* The Micro User *– not to mention the unknown programmer of the HP85 version – for a great contest.*

*If any of your readers haven't typed in the game yet, get typing. It is well worth it.* – **Peter H. Lloyd, Dunstable.**

## Circuit boards

*IS there on the market a program for help to design a printed circuit board? Here in the Netherlands such a program is not available for the BBC.*

*Is such a program available for the BBC or maybe with a second 6502 or Z-80?*

*In Holland such a program is only available for the IBM-PC and the CBM-64.* – **B.M. Harms, Emmen, Netherlands.**

● Pineapple Software has recently released a program to help design circuit boards and can be contacted at the following address: 39 Brownlea Gardens, Seven Kings, Ilford, Essex IG3 9NL.

## ISO-Pascal and Elite

*I THINK I should draw your readers' attention to the fact that ISO-Pascal does not compile when Wordwise+ is in a higher priority ROM socket than it. If the Pascal has higher priority, then both ROMs function.*

*There are several strange things I have found with the disc version of Elite.*

*If you do Copy X Delete, then press Ctrl+H while hyperspacing, then you get automatically attacked by the Thargoids. Useful for picking up alien items, if you survive.*

*A copyright notice also comes up under the "Elite" sign at the beginning.*

*Also, if you go behind the space station so that you are looking at the face without the entrance hatch, and turn on the docking computer, the computer tries to dock with a blank wall, and you crash.* – **Ben Dessau.**

● Unfortunately Wordwise+ makes use of *FX163 in a way that Acornsoft considers "illegal" – without any parameters. This means that Iso-Pascal, Logo and the Graphics Extension ROM won't work unless they're in a higher priority socket.

We're sure Elite fans will be grateful for your discoveries.

## Clear of bugs

*I SHOULD like to take this opportunity to thank you for your assistance with debugging the Harbour Command game and tell you that by inserting those two spaces the program runs successfully.*

*The reason I haven't used my own error routine yet is due to the machines I have previously worked on – Dragons and Tandys – these facilities were not available and I am finding the need to go right back to basics with my learning on the BBC Micro.*

*Because of the assistance you have given which I feel is superior to that of other magazines I have decided to take out a 12 month subscription rather than risk missing an issue in the shops.* – **Roger P.S. Price, Warley, West Midlands.**

● We're always glad to hear from satisfied customers. Remember though, we need to have an SAE with your queries.

## Mini Office on serial printer

*I HAVE just read Michael Nyman's letter in The Micro User about using Mini Office with a serial printer.*

*As I have been doing this on a Mannesman Tally T-1612 printer I thought I had better describe my technique.*

*I select the RS423 output with *FX5,2 then CH."" Mini Office. This loads the loader program and then turns off the cassette motor.*

*I then press line feed on the printer which turns the cassette motor back on. The word processor then loads as normal and any text can be printed in the normal manner. This letter has been produced using this procedure.*

*I cannot offer any technical reason why line feed allows me to run the program and print via the serial port, but it works.*

*I have found two problems using this technique.*

*The first line always starts with an @ and indents the first printed line after the left margin with one blank character.*

*Also the first print stops after two lines and will go no further. By pressing escape and starting over again printing is as normal.*

*Thank you for The Micro User magazine, it's the best buy for any BBC computer user.* – **John Butler, Preston.**

## Alien war cry

*HERE is a short program that sounds very much like the aliens attacking your Cobra Mark III in Elite.* – **K.R. Clover, Ipswich, Suffolk.**

```
   10 REM K.R.CLOVER 1985
   20 CLS
   30 *TV255
   40 PRINT:PRINT "ELITE AL
IEN SHOOT"
   50 PRINT"PRESS ANY KEY"
   60 PRINT"KEEP PRESSED FO
R FULL ATTACK"
   70 A$=GET$
   80 PRINT:PRINT:PRINT
  100 ENVELOPE 3,1,16,-12,1
,25,25,25,10,-10,0,-10,126,
25
  130 MODE 7
  140 J%=RND(50):B%=RND(3):
D%=RND(25)
  150 PRINT"ENVELOPE 3":PRI
NT"B%= CHANNNEL",B%:PRINT"J
%= PITCH  ",J%:PRINT"D%= DU
RATION",D%
  160 PROCA
  170 GOTO 40
  200 DEFPROCA SOUNDB%,3,J%
,D%:ENDPROC
```

# Paged RAM loader for B+

*I FOUND the article on the B+ by Jim Notman very interesting, and it prompted me to experiment with the paged RAM.*

*It is possible to load languages and service ROMs from disc and run them in the paged RAM on the B+.*

*The program printed below prompts for a file name, which it then transforms to paged RAM.*

*It also changes the user vector (used by *LINE) to point to a software patch.*

*The patch is needed to change a *LINE command to one that is able to be read by a paged ROM. It then uses the indirect vectors to pass the command to paged RAM.*

*In this way a normal *[command] can be implemented by using *LINE [command].*

*The program as it stands uses the NET workspace as a safe place for the patch. On NET machines the setting of P% at line 570 will need to be changed.*
– **T. Godman, Sandown, IoW.**

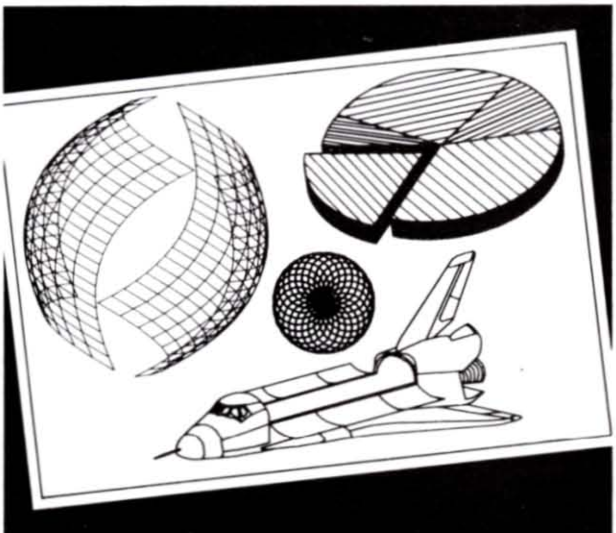
*P.S: After a break the user vectors will need resetting to point back to the patch.*

```
?&200=&91:?&201=0
```

*will allow you to still use *LINE [command].*

● Thanks for a neat program. We must point out, though, that the ROMs you've got on disc must be from ROMs you have purchased – otherwise you're breaking copyright.

```
   10 REM Paged RAM Loader
   20 REM by T. Godman
   30 REM BBC B+
   40 MODE 7
   50 DIM code% 70
   80 PROCassemble
   90 INPUT'"Please enter f
ilename :"file$
  100 PRINT
  110 OSCLI "LOAD "+file$+"
 2000"
  120 CALL code%
  130 PRINT "File transfere
d to paged RAM."
  140 PRINT "Use *LINE comm and."
  150 PRINT
  160 END
  170 REM
  180 DEFPROCassemble
  190 P%=code%
  200 [OPT2
  210 SEI
  220 LDA &F4
  230 STA &74
  240 LDA #&80
  250 STA &F4
  260 STA &FE30
  270 STA &73
  280 STA &DA0
  290 STA &DA1
  300 LDA #&20
  310 STA &71
  320 LDA #&91
  330 STA &200
  340 LDA #3
  350 STA &D9F
  360 LDA #0
  370 STA &70
  380 STA &72
  390 STA &201
  400 TAY
  410 .loop
  420 LDA (&70),Y
  430 STA (&72),Y
  440 INY
  450 BNE loop
  460 INC &71
  470 INC &73
  480 LDA #&B0
  490 CMP &73
  500 BNE loop
  510 LDA &74
  520 STA &F4
  530 STA &FE30
  540 CLI
  550 RTS
  560 ]
  570 P%=&91
  580 [OPT 2
  590 LDA #4
  600 STX &F2
  610 STY &F3
  620 LDY #0
  630 JMP &FF00
  640 ]
  650 ENDPROC
```



All this can happen when you Plotmate your micro

Plotmate is new. Excitingly new.

It's a rugged, responsive flatbed plotter with a lot of built-in magic.

You can use it to create fantastic patterns. Some small as a postage stamp. Or big as an A2 poster.

It'll produce overhead transparencies for you. And all dimensions of graphs, diagrams and charts.

It'll also prepare maps. Then put the contours in.

And that's only part of it.

You should see its repertoire of characters – a whole sci-fi population for you to manipulate.

Plotmate software accepts all the colour, vector, character and graphics commands of your BBC micro.

You just plug it in and away you go. All for less than £300.*

Phone 0702 541664 for details.

Get Plotmating soon.

PLOTMATE

**LINEAR GRAPHICS LIMITED**
28 Purdeys Way Purdeys Industrial Estate Rochford Essex
Telephone 0702 541664 Telex 995701 Ref 356

*exc VAT

## Vital hash sign

*I AM trying to write a machine code program that calls the operating system with JSR &FFF7. I can get this to work from Basic but all sorts of things happen from machine code.*

*The following is a sample program of the sort of thing I'm trying to do.*

*It should catalogue the disc but it does either nothing or gives me random error messages such as "Bad string" or "Bad command" depending on how many NOP instructions I put into the program.*

```
   10 DIM MC% &100
   20 FOR O=0 TO 2 STEP 2
   30 P%=MC%
   40 [OPT O
   50 .begin
   60 LDX string MOD 256
   70 LDY string DIV 256
   80 JSR &FFF7
   90 RTS
  100 .string
  110 EQUS"CAT"
  120 EQUB 13
  130 NOP
  140 NOP
  150 NOP
  160 NOP
  170 NOP
  180 NOP
  190 NOP
  200 NOP
  210 NOP
  220 ]
  230 NEXT
  240 PRINT"CALL begin with
 string """$string""""
  250 CALL begin
>RUN
CALL begin with string "CAT
"

Bad command at line 250
```

*I hope that you can help as part of my latest mammoth program depends on it. I have OS 1.2, Basic II on the Issue 3 board.* – **H. Summers, Norwich.**

● You've made a very common mistake in lines 60 and 70. Whenever you use OSCLI the X and Y registers point to the address of the star command you wish to execute.

Therefore, if the string is at address &810 you load X with &10 and Y with &8.

If the string's location is given by a variable you use the MOD and DIV commands to calculate the low and high bytes of the address.

Using the BBC Micro's assembler we would use something like this:

```
100 LDX #string MOD 256
110 LDY #string DIV 256
```

We're sure you can now see the important hash character you missed out which indicates that immediate addressing is being used.

In your program you load the X and Y registers with the contents of the strings address MOD 256 and DIV 256 – both in zero page.

These will obviously point to the wrong address. This is why you get "Bad command" error messages.

## Revs up and loaded

*I WAS surprised to read the letter from K.G. Metcalf in your September issue regarding Revs not working with UDM's DDFS 2.0.*

*I have this DDFS fitted and Revs (version 1) does load with it.*

*The program does, however, seem to be well protected, taking almost a minute to load and then only if the machine has been switched off before loading.*

*If any readers, like me, have had trouble fitting Cheetahs Sweet Talker because of having a DDFS fitted they should send me an SAE, I'll send them details of how to get around this.* – **Mark Randall, 5 Redwood Close, Irchester, Northants NN9 7BX.**

## Foreign characters

*IN recent issues there has been some letters about the BBC Micro and foreign characters.*

*This can be solved by redefining the characters in Modes 1–6 or using the chip SA 5052 instead of SA 5050 for Mode 7.*

*After a while you will get tired of having to boot in some redefining program every time you use the computer. I finally lost my patience when, even with machine code routines I couldn't redefine the characters in a terminal emulation program (Communicator by Computer Concepts).*

*The following alterations will insert Swedish characters in the operating system ROM. This was done by reading the ROM with an eprom programmer from Watford Electronics.*

*The character definitions are located from location &0000 to &02F8 in blocks of eight consecutive bytes starting with character &20 (blank) and ending with &7F (delete) – see User Guide, page 492.*

*The alterations will place the Swedish characters where a printer expects them to be (&5B-&5D and &7B-&7D) but remember that some commercial programs use the original characters for graphic effects, for example Intersheet.*

*The new version of the operating system must be burnt into an 27128 eprom and placed in the appropriate socket.*

*Changes:*

```
&0108  7C 60 60 60 60 60 7C 00
&01E0  00 60 30 18 0C 06 00 00
&01E8  3E 06 06 06 06 06 3E 00
```

*Should be changed to:*

```
&0108  24 7E 66 66 7E 66 66 00
&01E0  24 3C 66 66 66 66 3C 00
&01E8  18 7E 66 66 7E 66 66 00
```

*and:*

```
&02D8  0C 18 18 70 18 18 0C 00
&02E0  18 18 18 00 18 18 18 00
&02E8  08 00 18 0E 18 18 30 00
```

*should be changed to:*

```
&02D8  14 00 3C 06 3E 66 3E 00
&02E0  24 00 3C 66 66 66 3C 00
&02E8  08 00 3C 06 3E 66 3E 00
```

*The definitions are of course second processor compatible.* – **Torsten Ofverholm, Department of Anatomy, Göteborg.**

● A very clever technique, but we must point out that the altered ROM must be for your use only – the copyright remains with Acorn.

# Transistor leads reversed

*I READ with interest the letter on page 151 of the July Micro User, "A marriage of inconvenience", because I too had problems when I tried to use a Canon printer on my upgraded Model A.*

*I had been using both a Seikosha and an Epson printer quite successfully and then tried to use the then newly-introduced Canon model PW1080.*

*The printer would not, however work on my upgraded Model A but when tried with a Model B proved to be faultless.*

*My investigations eventually isolated the transistor identified as Q11 on the circuit diagram in the User Guide. On the issue 2 board of my Model A and on the issue 3 board of the Model B that I used, this transistor is connected at the point identified as S1.*

*The fault was found to be due to the fact that the collector and emitter leads were reversed when soldered to the board. Thus the collector was connected to zero volts and the emitter to pin 1 of PL9. When correctly connected, the printer worked perfectly, as this letter proves.*

*As this transistor was fitted at manufacture, there may be a number of such faulty Model A machines that will not work with certain printers because those printers require more drive power on the strobe signal line.*

*While this may not be the fault on your correspondent's machine, publication of the above details may help other users with printer problems of an odd nature.* – **B.J. Townsend, Chelmsford.**

**RAMWISE**

**16K Sideways RAM MODULE**

**£24.95**

**+ £1 post & package**

- ★ *More than one module can be fitted.*
- ★ *No soldering required.*
- ★ *Small module plugs directly into any spare ROM socket.*
- ★ *Write Protect-switch included.*
- ★ *Disk based software provided to save and load Roms.*
- ★ *Runs all existing ROMs.*
- ★ *Already used in schools on Network Systems.*

*(The above software can also be purchased separately for* ***£6.95*** *+ 50p post and package)*

**CYGNET ELECTRONICS**

**PO Box 27, Bordon, Hants. GU35 0HH**
**Phone (04203) 89220 (04203) 5229**

**SPECIAL OFFER!!**

We offer from our UK stocks, the following BBC Micro compatible RAMS and EPROMS:

**27128-25 at £3.40**

**2764-25 at £2.30**

**6264LP-15 at £4.75**

**6116LP-3 at £2.60**

We can also supply 7002C, 6845SP, 74LS series, TTL, capacitors, passives, resistors, etc . . .
Why not send us a list of our current component requirements?

**QUANTITY DISCOUNT AVAILABLE!**

**ROMBYTE LIMITED – (01-402 9461)**
**65 Blandford Street, London W1H 3AJ**

Please send your order and remittance to the above address. A prompt despatch is guaranteed.
All prices exclude P&P (50p) and VAT (15%) on the total.

**GET ON-LINE WITH DATABEEB!**

For under £30 this ROM-based package from MIRACLE TECHNOLOGY will give you, your modem and your BBC computer access to Prestel*, Micronet*, Viewdata, telex, Microlink*, electronic mail, bulletin boards and databases, handling baud rates of 1200/1200, 75/1200, 1200/75 and 300/300.

Features include carousel facility, Macro Command File, error trapping and telesoftware downloading.

The package, including full fitting instructions, User Guide and Function Key Guide costs £29.90 inc VAT & UK P/P.

To get your BBC on-line – clip the coupon today!

Please send me

☐ DataBeeb packages @ £29.90 inc VAT & UK/PP.

☐ I enclose cheque/postal order

☐ charge my Access/Visa card no:

. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .

expiry date . . . . / . . . . / . . . .

Name . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .

Address . . . . . . . . . . . . . . . . . . . . . . . . . . . .

. . . . . . . . . . . . . . . . . . Postcode . . . . . . . . . . . .

send to:
BBC Support (1), Miracle Technology (UK) Ltd,
St Peters Street, Ipswich IP1 1XB. Tel 0473-216141.

*reg'd trade marks of the companies concerned

MIRACLE TECHNOLOGY

**COLLINS – THE BEST IN COMPUTING**

**The BBC Micro Advanced Reference Guide**
**Bruce Smith**

A complete reference guide to all aspects of the BBC Micro including the BBC B+, this invaluable book includes details of BASIC, assembler, the machine operating system, the filing systems and the hardware itself. 0 00 383223 6 £10.95

**MicroProlog and Artificial Intelligence**
**A.A. Berk**

A simple and concise explanation of MicroProlog introducing the language in company with its main application – artificial intelligence.

0 00 383158 2 £9.95

A.A. BERK
MICRO-PROLOG
& ARTIFICIAL INTELLIGENCE

**ORDER FORM**

Please order from your bookseller or send this form with your remittance or credit card details to: Dept 44, Collins Professional and Technical Books, 8 Grafton Street, London W1X 3LA

Please send me:

☐ BBC Micro Advanced Reference Guide 0 00 383223 6 £10.95

☐ MicroProlog and Artificial Intelligence 0 00 383158 2 £9.95

I enclose my remittance for £

(Postage: Add £1.50 for first purchase plus 50p for each additional item)

Name

Address

**MONKEY**

**AS SEEN ON TV**

Monkey is full of fun and magic.
Monkey provides the basis for whole-class project.
Monkey encouraging class activities.

For children age 7+

*The package includes:*
A two-part adventure program + story.
An illustrated story book.
A comprehensive teacher manual + a lot of suggestions for class activities.
A Monkey poster.

西遊記

**BBC B Version now available**
**£16 + VAT for Disc** (Price includes P&P)
**£15 + VAT for Tape** (Price includes P&P)

**RML and Commodore 64 version in preparation.**

***C & C Co.***
***9 Ettrick Place, Ayr KA8 9HH***
***Tel: 0292 289470 or***
***Tel: 0292 74241***

*We also welcome official government or school orders.*

*Mail Order please fill in coupon with your remittance.*

**To: C & C Co.**
**9 Ettrick Place, Ayr KA8 9HH**

Please send me _____ copies of Monkey Disc Package at £16 + VAT (£18.40)

Please send me _____ copies of Monkey Tape Package at £15 + VAT (17.25)

I enclose a cheque/Postal Order for £ _______

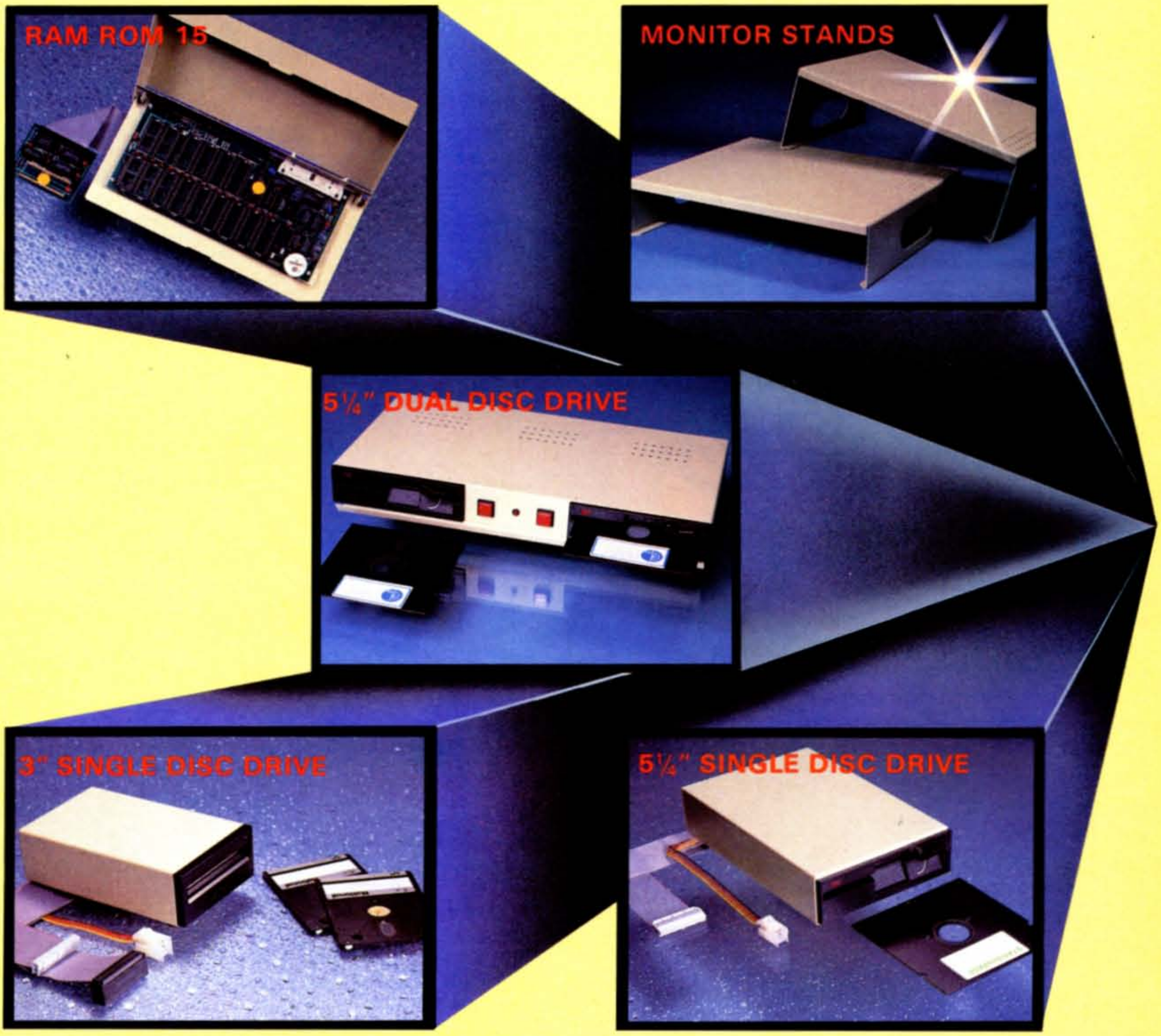
Name _______

Address _______

_______ P.Code _______

Sig. _______ Date _______

EC2


BBC ?-
RAM ROM 15
MONITOR STANDS
5¼" DUAL DISC DRIVE
3" SINGLE DISC DRIVE
5¼" SINGLE DISC DRIVE
-GCC!

# 5 WAYS TO IMPROVE YOUR BBC. . . . .

## 3" SINGLE DISC DRIVE

One of the most compact disc drives available today, the 3" Drive features the ingenious dual-sided cartridge style protected disc. The twin sided discs, 100K both sides, are physically protected at all times. The whole unit is very quiet and fast in operation and comes complete with all necessary cables, manual and formatting disc. In its sturdy, BBC colour coded metal case this drive is ideal for many varied uses especially within the educational field.

£86.00 + VAT = £98.90 inc. P. & P.

## 5¼" SINGLE DISC DRIVE

This highly reliable, high performance half height single 5¼" disc drive is fully BBC compatible 400K 40/80 Track switchable drive. The drives come complete with all necessary cables, formatting disc and disc drive manual, one year warranty and are supplied in a BBC colour coded metal case. Equally at home alongside or on top of your BBC Micro at £167.85 + VAT = £193.03 inc. P. & P.

## 5¼" DUAL DISC DRIVE

Finished in a metal case the same colour as the BBC, this slim compact dual disc drive, fully BBC compatible, is at home on top of the BBC Micro and is angled to allow easy access to the drive doors. Featuring twin 400K 80 Track drives the unit is also 40/80 Track switchable, the switch being mounted on the front of the unit with LED illumination.

Complete with all necessary cables, formatting disc and disc drive manual and a one year warranty, the complete unit is available at £358.00 + VAT = £411.70 inc. P. & P.

## RAM ROM 15

". . . . . for those who want an expansion board (RAM/ROM) of the highest specification the RAM ROM 15 will not disappoint". (Acorn User April 1985). The RAM ROM 15 is an external board which allows the use of a maximum 16 sideways ROM sockets plus the necessary hardware for up to 16K of battery backed sideways RAM. With "No Solder" installation, the fully buffered RAM ROM 15 can be optionally powered by an external PSU, thereby virtually eliminating power drain and overheating problems.

RAM ROM 15 is "of the highest specification" but ONLY £89.99 + VAT = £100.79 inc. P. & P.

## MONITOR STANDS

These robust metal monitor stands are finished in the same colour as the BBC Micro. They are available in two heights:

The High Stand: Which enables the stand to be used in conjunction with the BBC Micro and disc drive.

The Low Stand: Fits neatly over the BBC Micro on its own.

To tidy up your BBC, Disc Drives and Monitor, these drives are available at:

High Stand £18.00 + VAT = £20.70 inc. P. & P.
Low Stand £16.00 + VAT = £18.40 inc. P. & P.

## ALSO AVAILABLE:

ROMEX 13
STARdataBASE
THE CRACKER
COMPONENTS
COMING SOON - NEW PRINTER SHARER/BUFFER

## FOR FURTHER TECHNICAL SPECIFICATIONS RING GCC ON

**GCC (Cambridge) Ltd**

LIMITED

## BBC PRODUCTS AND COMPATIBLE PERIPHERALS

### BBC MICROCOMPUTER SYSTEM

| | |
|---|---|
| BBC MODEL B | £323 + VAT = £380.00 |
| BBC DISC INTERFACE KIT | £82.61 + VAT = £95.00 |
| BBC DISC INTERFACE KIT % 1.2 ROM | £91.30 + VAT = £105.00 |
| BBC A to B UPGRADE KIT | £60.87 + VAT = £70.00 |
| BBC MEMORY UPGRADE KIT (8 x 4816-100ns) | £17.39 + VAT = £20.00 |

### MONOCHROME MONITORS

| | |
|---|---|
| KAGA AMBER SCREEN | £109.00 + VAT = £125.35 |
| KAGA KX-12 GREEN SCREEN | £109.00 + VAT = £125.35 |

### COLOUR MONITORS

| | |
|---|---|
| KAGA VISION EX Medium Resolution | £215.00 + VAT = £247.25 |
| KAGA VISION 2 High Resolution | £285.00 + VAT = £327.65 |
| KAGA VISION 3 Super High Resolution | £399.00 + VAT = £458.85 |

### DAISYWHEEL PRINTERS

| | |
|---|---|
| DAISYWHEEL 2000 | £289.00 + VAT = £332.35 |
| JUKI 6100 | £346.95 + VAT = £399.00 |

### DOT MATRIX PRINTERS

| | | |
|---|---|---|
| STAR DP510 | 80 Col. | £199.00 + VAT = £228.85 |
| NEC PC8023 | 80 Col. | £223.20 + VAT = £256.75 |
| EPSON RX8080 | Col. | £249.00 + VAT = £286.35 |
| EPSON RX80FT | 80 Col. | £285.00 + VAT = £327.75 |
| EPSON FX80 | 80 Col. | £438.00 + VAT = £503.70 |
| EPSON FX100 | 132 Col. | £450.00 + VAT = £517.50 |
| EPSON MX100 | 132 Col. | £475.00 + VAT = £546.25 |
| EPSON LQ1500 (NLQ) | 132 Col. | £1100 + VAT = £1265.00 |
| KAGA KP810 (NLQ) | 80 Col. | £319.00 + VAT = £366.85 |
| KAGA KP910 (NLQ) | 132 Col. | £434.74 + VAT = £499.95 |
| SEIKOSHA GP 100 | 80 Col. | £199.00 + VAT = £228.85 |
| GEMINI 10X | 80 Col. | PRICE ON APPLICATION |

### BBC FIRMWARE

| | |
|---|---|
| GRAPHICS ROM | £29.90 + VAT = £33.35 |
| DISC DOCTOR | £29.00 + VAT = £33.35 |
| GREMLIN | £29.00 + VAT = £33.35 |
| TERMI | £29.00 + VAT = £33.35 |
| PRINT MASTER | £29.00 + VAT = £33.35 |
| PASCAL | £59.00 + VAT = £67.85 |
| FORTH | £34.72 + VAT = £39.93 |
| VIEW | £52.00 + VAT = £59.80 |
| WORDWISE | £40.00 + VAT = £46.00 |
| BEEBASE | £35.00 + VAT = £40.25 |

### BBC ACCESSORIES

| | |
|---|---|
| STARdataBASE | £67.22 + VAT = £77.30 |
| CRACKER | £62.50 + VAT = £71.88 |
| EXTRA LANGUAGES | £60.00 + VAT = £69.00 |
| SINGLE 400K 5¼" DISC DRIVE 40/80T SWITCHABLE | £167.85 + VAT = £193.03 |
| DUAL 800K 5¼" DISC DRIVE 40/80T SWITCHABLE + PSU | £358.00 + VAT = £411.70 |
| SINGLE 3" DISC DRIVE | £86.00 + VAT = £98.90 |
| LOW MONITOR STAND | £16.00 + VAT = £18.40 |
| HIGH MONITOR STAND | £18.00 + VAT = £20.70 |
| 6116 (2K) | £5.50 + VAT = £6.33 |
| 6264 (8K) | £15.00 + VAT = £17.25 |
| TEXTOOL | £8.00 + VAT = £9.20 |
| GCC NIF | £8.00 + VAT = £9.20 |
| ULTRA CALC | £69.13 + VAT = £79.50 |

### BBC ACCESSORIES (continued)

| | |
|---|---|
| ROBIN LIGHT PEN (Standard) | £26.00 + VAT = £29.90 |
| ROBIN LIGHT PEN (Touch Switch) | £36.00 + VAT = £41.40 |
| RGB MONITOR LEADS | £6.04 + VAT = £6.95 |
| MONOCHROME MONITOR LEADS | £3.48 + VAT = £4.00 |
| 562 PRINTER RIBBONS | £3.00 + VAT = £3.45 |
| 570 PRINTER RIBBONS | £2.50 + VAT = £2.87 |
| EPSON MX-80 | £4.25 + VAT = £4.89 |
| SHINWA CP-80 | £5.50 + VAT = £6.33 |
| IBM (MULTI-STRIKE) | £5.00 + VAT = £5.75 |
| KAGA (Cartridge for KP810/KP910) | £4.00 + VAT = £4.60 |
| BBC PRINTER CABLE | £8.33 + VAT = £9.57 |
| BOX LISTING PAPER | £16.00 + VAT = £18.40 |
| ALL IC's Available for BBC | PRICES ON APPLICATION |
| GCC ROMEX 13 Sideways ROM Extension | £35.00 + VAT = £40.25 |
| GCC RAM/ROM Extension Board | £86.95 + VAT = £99.99 |

Access

TRADE
ENQUIRIES
WELCOME

VISA

LIMITED

GCC (Cambridge) Limited
66 High Street, Sawston,
Cambridge CB2 4BG
Telex: 81594 SAWCOM

**0223-835330/834641**

DARTS ON T.V.?

DOUCE ware 'DARTS'

HERE'S SOMETHING DIFFERENT!

* * * * * * * * * * * * * * * * * * * * * *

*** DOUCEware "DARTS" ***

* * * * * * * * * * * * * * * * * * * * * *

LOOK AT THESE FEATURES:-

- NEEDS SKILL (4 LEVELS SELECTABLE)
- FOR 1, 2 OR MORE PLAYERS
- MULTIPLANE COLOUR GRAPHICS
- FULL-COLOUR DARTBOARD
- REALISTIC SCORING PRESENTATION
- "DEFLECTIONS" & "WIRE BOUNCES"
- SHOWS WINNER'S NUMBER OF DARTS
- SUGGESTS FINISHES IF REQUIRED

Send cheque/P.O. for £8.00 to:

**DOUCEware**
**26 West Drayton Park Ave.**
**West Drayton**
**Middlesex**
**UB7 7QA**

*** for BBC 'B' 32K ***

Allow 21 days for delivery

Cassette version only

* * * * * * * * * * * * * * * * * * * * * *

*** DOUCEware "DARTS" ***

* * * * * * * * * * * * * * * * * * * * * *

LARGEST COMPUTER CENTRE
in
MANCHESTER

| **COMPUTERS** | |
|---|---|
| Apricot F1E | £644 |
| Apricot F1 | £918 |
| Apricot F2 | £1385 |
| Apricot PC (2 x 315K disk) | £1493 |
| Apricot PC (2 x 720K disk) | £1679 |
| Apricot other | POA |
| Advance 86b 256K | £675 + VAT |
| Ferranti 860 | Promotional Price |
| Ferranti 860XT | Promotional |
| BBC Range | POA |
| Amstrad 6128 Green | £298 |
| Amstrad 6128 Colour | £398 |
| Amstrad 8256 | £458.85 |
| Atari 520ST | £749.99 |
| Commodore C128 | POA |
| Memotech 500 | £99.95 |
| Memotech 512 | £129.95 |
| Sanyo 555 | £799 + VAT |
| Olivetti M21 | Call |
| Olivetti M24 | Call |
| **THIS MONTH'S BARGAINS** | |
| Advance 86B (256K, Perfect Software, 1 year's maintenance) | £600 + VAT |
| **BBC** | |
| Greek Operating System | £62.10 |
| French Operating System | £62.10 |
| Shugart 400K 40/80 Disc | £119.95 |
| Shugart Dual 2 x 400K Plus PSU | £229 |
| Datagem | £79.95 |

**BBC DEALERSHIP**
Beebug Soft, Computer Concepts, Gemini, Akhter

| **PRINTERS** | |
|---|---|
| Canon PW1080 | £289 |
| Shinwa | POA |
| Epson LX80 | £269.95 |
| Juki 6100 | £389.00 |
| Brother HR15 | £385.00 |
| Brother HR10 | Call |
| Panasonic | £319.95 |
| Smith Corona (Fastex 80) | £165.00 |
| Brother EP44 | £234.95 |
| Brother M1009 (Cent + RS232) | £195.95 |
| Full Star Range of Printers | POA |
| Seikosha GP505 (Spectrum) | £89.95 |
| Seikosha GP50A | £115.00 |

**Computer Furniture**
hago, Opus, Shincrest

**Disk Drives**
Opus, Pace, Cumana also Quest Winchesters

**Computer repairs available**

Thought of the day – We have 15 different types of BBC Joysticks – have we gone BANANAS?

Large Showroom. All items include VAT unless indicated.
Now FREE delivery mainland UK. Personal Export Scheme.
No VAT on Export. No Orders too Small

**MIGHTY MICRO**

268 Wilmslow Road
Fallowfield, Manchester M14 6WL
Tel: 061-224 8117
Easy access M56, M61, M62, M63

PRINTERLAND

ORDERED TODAY - DELIVERED TOMORROW

*Free* WITH ALL PRINTERS: BBC USERS PRINTERS GUIDE.
Getting the best from your printer is not easy.

We supply a **free** booklet with all printers which explains how to obtain all the features available on your printer. Without this you could waste many hours. Buy elsewhere and you'll pay far more and get far less.

| ■ **DOT MATRIX** | EX VAT | INC VAT |
|---|---|---|
| SHINWA CPA80 | £165.00 | £189.75 |
| EPSON FX80 F/T+ | £314.00 | £361.10 |
| EPSON FX100 F/T+ | £425.00 | £488.75 |
| ■ **DOT MATRIX PLUS NEAR LETTER QUALITY** | | |
| EPSON LX80 NEW | £195.00 | £224.25 |
| JUKI 5510 | £249.00 | £286.00 |
| CANON 1080A | £240.00 | £276.00 |
| CANON 1156 or KAGA 910 | £335.00 | £385.25 |
| ■ **DAISY WHEEL** | | |
| QUENDATA 1120 | £225.00 | £258.75 |
| JUKI 6100 | £325.00 | £373.75 |
| EPSON DX100 SPECIAL OFFER | £356.00 | £409.40 |
| ■ **COLOUR PRINTERS** | | |
| EPSON JX-80 SPECIAL OFFER | £450.00 | £517.50 |
| CANON PJ1080A | £425.00 | £488.75 |
| ■ **PRINTER TYPEWRITER COMBINED** | | |
| JUKI 2200 | £245.00 | £281.75 |
| ■ **ACCESSORIES** | | |
| WORDWISE + | £43.00 | £49.45 |
| BBC PRINTER CABLE | £8.00 | £9.20 |
| ■ **UTILITIES** | | |
| CLEARANCE SALE OF REPLICA 11's NORMALLY £12 | | |
| REPLICA II Tape to Disc Copier | £5.00 | £5.75 |

Printerland Unit 27, Estate Buildings, Railway St, Huddersfield HD1 1JP

Tel: (0484) 514105/512037

POOLS WITH PREDICTOR

BBC 'B' & Electron

PLUS

FREE RACING ANALYSER

14,000 MATCH DATABASE

After three successful seasons, we know a thing or two about successful pools prediction on home computers. Things like 7 powerful methods of analysing form. Like a massive database and easy data entry. Not forgetting tuning facilities to let you improve your forecasts as the season progresses. We've combined all of these and much more into the 1985-86 version of our renowned Football Pools Predictor Program. And to complete this outstanding punter's package, there is a free Racing Analyser Program to let you analyse any race using the racecard from your daily paper. Now beat that for value!

BOTH PROGRAMS FOR ONLY

£8.99

**MAYDAY SOFTWARE**

**181 Portland Crescent**
**Stanmore, Middx. HA7 1LR**

# MICRODEAL / Salamander

# Special Offers

| | | | |
|---|---|---|---|
| BBC MICRODEAL | **AIR TRAFFIC CONTROL** | ~~£8.00~~ | **£1.99** |
| BBC MICRODEAL | **SPACE SHUTTLE** TAPE | ~~£8.00~~ | **£4.95** |
| BBC MICRODEAL | **SPACE SHUTTLE** DISK | ~~£9.95~~ | **£6.95** |
| BBC SALAMANDER | **737 FLIGHT SIMULATOR** TAPE | ~~£9.95~~ | **£6.95** |
| BBC SALAMANDER | **DRAGON RIDER** TAPE | ~~£7.95~~ | **£2.95** |
| BBC SALAMANDER | **EAGLE** TAPE | ~~£7.95~~ | **£2.95** |
| BBC SALAMANDER | **GAMES PACK 1 OR 2** TAPE | ~~£6.95~~ | **£1.99** |
| BBC SALAMANDER | **GRAPHICS PACKAGE** TAPE | ~~£19.95~~ | **£9.95** |
| BBC SALAMANDER | **TANKS** TAPE | ~~£7.95~~ | **£2.95** |
| BBC SALAMANDER | **3 GAMES PACK OF TAPES**<br>DRAGON RIDER/TANKS/EAGLE | ~~£23.85~~ | **£4.95** |
| ELECTRON | **SPACE SHUTTLE** TAPE | ~~£8.00~~ | **£4.95** |
| ELECTRON | **SALAMANDER 737 FLIGHT SIMULATOR** | ~~£9.95~~ | **£6.95** |
| ELECTRON | **SALAMANDER GRAPHICS SYSTEM** | ~~£9.95~~ | **£4.95** |

*75p Post and Packing Charge Per Order.*
*The above offers are available from your local computer dealer or order by phone from Micropost 0726 68020*

**5 YEARS OF MAIL ORDER SERVICE**

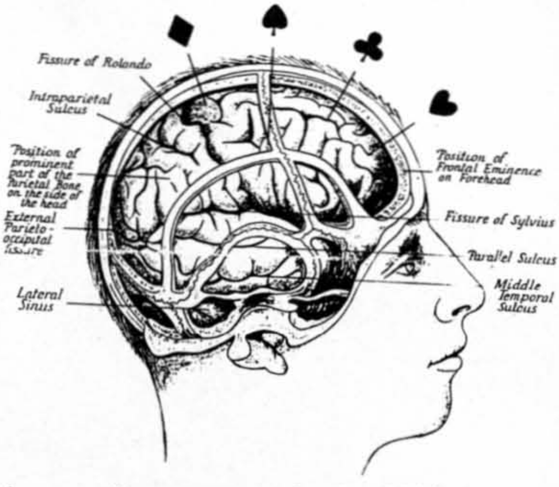
*or by post to* **MICROPOST Dept. AU,**
**41 Truro Road, St Austell Cornwall PL25 5JE.**

PLEASE SUPPLY

| QTY | ITEM | PRICE |
|---|---|---|
| | | |
| | | |
| | POST, PACKING 75p TOTAL | |

# BRAIN-AEROBICS

## Compendium of Mental Exercises


Fissure of Rolando
Intraparietal Sulcus
Position of prominent part of the Parietal Bone on the side of the head
External Parieto-occipital fissure
Lateral Sinus
Position of Frontal Eminence on Forehead
Fissure of Sylvius
Parallel Sulcus
Middle Temporal Sulcus

A new software concept for the BBC/ELECTRON providing four large, self-contained programs each intriguing brain exercises based on playing-cards.

**• SUPERB MODE 1 GRAPHICS • SUPER VALUE •**

**Cassette: £8.95** **Disc: £9.95**
*(State 40/80 track disc)*

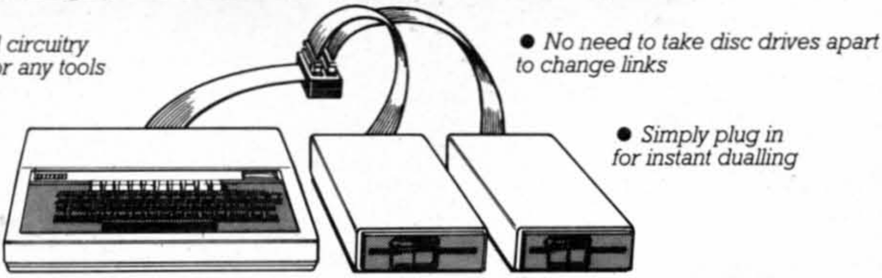
**Cheques to:-**

**MINIC BUSINESS SERVICES,**
**12 WOBURN CLOSE, BUSHEY,**
**HERTFORDSHIRE WD2 3XA.**

# DUAL DRIVES FOR LESS THAN £17?

## Convert your single disc drives into duals for only £16.96 inc. VAT

- *Specially designed circuitry eliminates the need for any tools*
- *No soldering*
- *No mess*
- *No need to take disc drives apart to change links*
- *Simply plug in for instant dualling*



**The Viglen DUCK (Dualling Up Connector Kit) can convert single drives to duals, instantly!**

Just plug the **Viglen Duck** into the BBC micro and any two single disc drives to create a dual disc drive. Drives will be configured Drive 0 and Drive 1 automatically.

- *Fast Back-Up*
- *Fast Copying of Files*

The **Viglen Duck** will dual-up any make or type of single disc drives *with PSU* (power supply unit). If you have disc drives *without* built-in PSU, then you will require a dual power connector for the BBC micro - available from Viglen for only **£11.50** inc VAT.

- Postage and packing **£2.50** inc. VAT.
- *Official Orders from Government and Educational Establishments welcomed.*

Viglen

Orders to: Viglen Computer Supplies
Unit 7, Trumpers Way, Hanwell W7 2QA

**Credit Card holders may order by telephone: 01-843 9903**

**All prices correct at time of going to press**

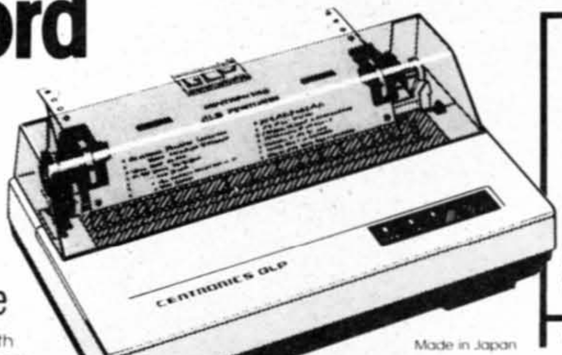
# The Great Little 80 column Printer from Viglen at a price everyone can afford

ONLY

**£159**

(INCLUDING VAT)

with interface cable



- All printers come standard with both serial and parallel interface
- 12cps near letter quality mode
- Normal 50cps draft printing
- Tractor and friction feed as standard
- Uses normal A4 sheet paper or continuous stationery
- Original plus 2 copies
- Bidirectional logic seeking
- 48 International characters
- Subscripts, superscripts and underlining
- Also available for IBM.

Made in Japan

Prices correct at time of going to press – offers subject to availability

**Post to:**
**Viglen Computer Supplies**
**Unit 7, Trumpers Way**
**Hanwell, W7 2QA**
**Tel: 01-843 9903**
Showroom/factory open
Monday – Friday 9.30–5.30
Saturday 9.30 – 4.00

***THE BEST PARTNERS FOR YOUR COMPUTERS***

**How to order by post** – Simply fill in the coupon with your requirements. Enclose your Cheque/P.O. or use your Access/Barclaycard. Please make cheques payable to VIGLEN COMPUTER SUPPLIES and post to the address shown left. Allow seven days for delivery, add £8.00 carriage, packing and ins. on all items.

**By telephone** – Ring **(01) 843 9903.** Credit Card holders (Access/Barclaycard only) can purchase by telephone. Please give Card No., Name, Address and items required.

Credit cards valid if signed by card holder. Address on coupon must be same as card holder.

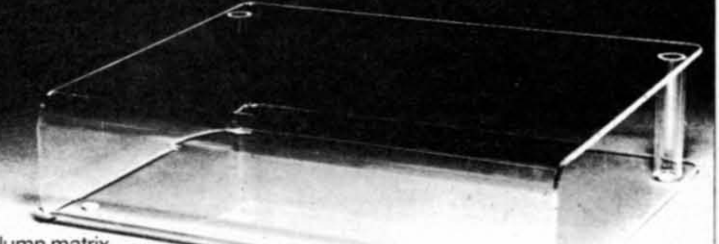
Please send me (state quantity)
— GLP printer(s)
I enclose Cheque/P.O. for £ ..............
add £8.00 carriage
State whether BBC, QL or IBM ..............
Name ..............
Address ..............
..............
I prefer to pay by ACCESS/BARCLAYCARD
(delete whichever is not applicable)
Card No ..............
Signature ..............

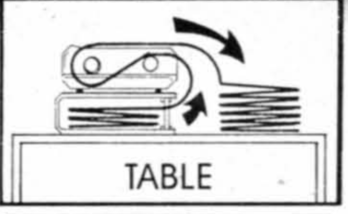
TYPE-BBC

# NEW! A PRINTER STAND

from

Viglen
COMPUTER SUPPLIES





Printer Stand
**£16.95** INC. VAT
Carriage & Packing £3.00

- For 80 column matrix printers
- Raises printer high enough to put continuous stationery underneath
- Beautifully finished in clear perspex ● Viglen quality every time
- Will accept paper up to 12½" wide ● Non slip rubber pads

Dimensions: 15" (380mm) wide (320mm) deep 4" (90mm) high
Also available 136 column stand @ £27 inc. VAT.

## COME TO VIGLEN FOR A FAST, FRIENDLY, PERSONAL SERVICE

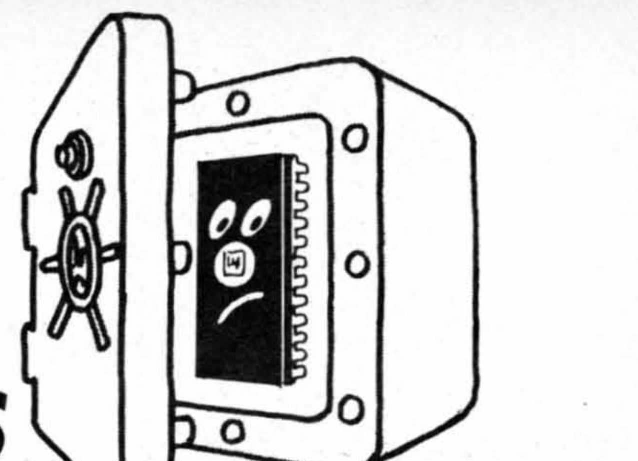
DEALER ENQUIRIES WELCOME

**Prices subject to change without notice**

MU11

Post to: VIGLEN COMPUTER SUPPLIES, UNIT 7, TRUMPERS WAY, HANWELL, LONDON W7 2QA.
Please send me ______ (qty) PRINTER STANDS at £19.95 each. enclose Cheque/P.O. for £ ______ made out to
VIGLEN COMPUTER SUPPLIES or debit my ACCESS/BARCLAYCARD No. ______
Name ______ Signature ______
Address ______

Viglen
The best partners for your computers



# YOUR ROMS WOULD BE HAPPIER IN A VIGLEN ROM CARTRIDGE SYSTEM

The safest way to look after your growing collection of ROMs is to store them in Viglen's specially designed cartridge systems, this not only keeps them happy, but also removes the risk of damage to your BBC micro.

There are two systems – the 'Standard' and the 'Low Profile'. Viglen is the leading producer of both.

## ADVANTAGES OF VIGLEN ROM CARTRIDGE SYSTEM

● All cartridges are gold-plated for durability and reliability, unlike others which are only silver plated. ● No need to switch machine off between cartridge changes. ● Insert and remove 'Wordwise' 'View' 'Disc Doctor', etc., at will, from your micro in absolute safety. ● Low, low power consumption unlike other systems. ● Save on memory.

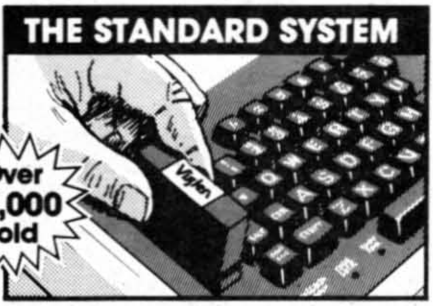
**PRICE FOR COMPLETE KIT,** Including 1 Cartridge, 1 Cable Assembly, 1 Blanking Off Plate (used if system is removed), 1 Socket Cover (used when no cartridges are resident to protect socket especially against dust or metal objects), 1 Cartridge Rack (stores cartridges when not in use). **£15.95**

Extra Cartridges: £2.95 each, four for £11.00 (i.e. £2.75 each), ten for £26.50 (i.e. £2.65 each). Kit comes with 1 ROM Cartridge. All prices inc. VAT.

**ACCESS/BARCLAYCARD By telephone: – Ring (01) 843 9903.** Credit Card holders (Access/Barclaycard only) can purchase by telephone. Please give Card No., Name, Address, and the items required.

Viglen are also major supplies to educational and government establishments and welcome further enquiries and orders.

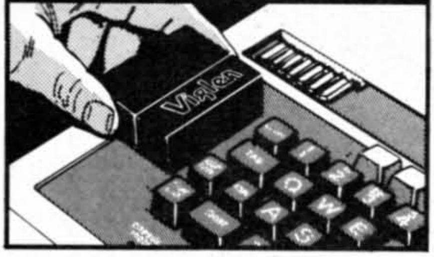
### THE STANDARD SYSTEM



**Over 30,000 sold**

The Standard System used extensively in education is preferred, due to its robust construction and ease of use.

### LOW PROFILE SYSTEM



With the sideways entry on the low profile system access to the escape and tab keys are slightly restricted. However Viglen betters its rivals in this respect by being 3mm lower.

**Viglen**

Unit 7 Trumpers Way
Hanwell W7 2QA
Tel: 01-843 9903

Personal Callers
Mon - Fri 9.30-5.30pm
Sat. 9.30-4pm

**Post to: VIGLEN COMPUTER SUPPLIES, UNIT 7, TRUMPERS WAY, HANWELL W7 2QA. Telephone: 01-843 9903.** MU 11

Please send me (state type and quantity) Cartridges

Kit(s)

Please add £2.50 for postage and packing (50p only for single cartridge).

I enclose Cheque/P.O. for £

I prefer to pay by ACCESS/BARCLAYCARD* (Delete whichever is not applicable).

Card No

Signature

Name

Address

Credit Cards valid if signed by Cardholder. Address below must be the same as card holder's.

Viglen
Viglen
Viglen
Viglen

*The best partners for your computer*

Please enquire about our extension keyboards, keypads EpromProgrammer

# All the peripherals for your BBC Model B

*the best service* *the best value*

## Dot Matrix Printers

C

***Prices include VAT***

| | |
|---|---|
| Taxan Kaga KP810 | **£279** |
| Canon PW1080A | **£279** |
| Epson RX80/FT | **£269** |
| Shinwa CPA80 (100cps) | **£219** |
| Mannesmann Tally MT80 | **£209** |

## Daisy Wheel Printers

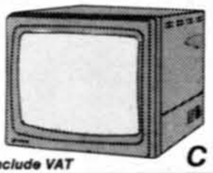
| | |
|---|---|
| Juki 6100 | **£329** |
| Quen Data | **£239** |
| Epson DX100 | **£359** |

***Prices include VAT***

Please add £8 for 1½ metre length printer lead for the BBC micro.

## Microvitec Monitors

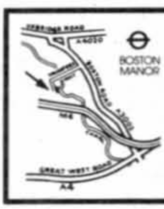
| | |
|---|---|
| Standard | £199 |
| Med & Pal | £295 |
| Med | £259 |
| High | £395 |



C

***Prices include VAT***

## BBC Model B and Model B with DNFS (latest 1.2 DFS) P.O.A.

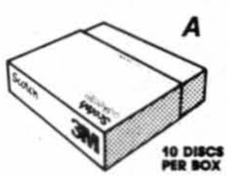


Visit our showroom:
Open
9.30-5.30
Mon to Sat.
9.30-4.00
Saturdays

## 3M Scotch Discs
### 5¼" single sided diskettes

| | 1-2 boxes | 3-9 boxes | 10+ boxes |
|---|---|---|---|
| SS 40 TRACK | £15.00 | £13.50 | £13.00 |
| DS 40 TRACK | £20.00 | £18.40 | £17.70 |
| SS 80 TRACK | £23.00 | £20.70 | £20.00 |
| DS 80 TRACK | £26.70 | £24.00 | £23.00 |

***Prices include VAT***



A

**10 DISCS PER BOX**

**Sales Hotline 01-843 9903**
Please call for latest prices, product details and to place credit card orders. Government and Educational Establishments enquiries welcome.

Prices correct at time of going to press. Offers subject to availability.

## DON'T BUY

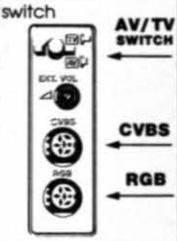
**just a colour monitor when you can have this New Philips TV + Monitor for only £199 INC. VAT**

C

## PHILIPS CT2007
### The official Philips/Monitor/TV Model

This very popular unit is not only an excellent Colour Television Receiver but also a sophisticated computer monitor.

- Headphone socket and speaker mute switch
- Free lead supplied for BBC Micro
- RGB, (TTL and can be modified for linear) Composite Video Input (CVBS), Audio Input + this model has an AV/TV switch
- 14" picture tube with 0.65mm resolution
- Maximum 80 characters per line
- 12 pre-select buttons
- Aerial supplied
- Swivel base available



## PHILIPS BM7502 Green Screen Mono

C

From the highly successful 'Philips 80 Range', here is a monitor specially designed to display graphics and alphanumeric data with perfect clarity.

- 12" high resolution, 20MHz band width, anti-glare screen
- Composite Video (CVBS) and Audio Input
- 2000 character (80 x 25) display
- Swivel base available
- Amber screen – £5 extra
- Suitable for the following units: BBC B (free leads supplied for the Beeb); Apple II, IIE, II+ Apple III; Atari 600XL, 800, 800XL, 1450XL, Coleco Adam; Commodore Vic20, Vic64; IBM-PC with interface; Texas Instr. T199/4A; Timex Sinclair; Einstein; QL.

**ONLY £85 INC. VAT**

Please add for carriage:–
**A**–£2. **B**–3.
**C**–£8.00

**Post to: VIGLEN COMPUTER SUPPLIES, UNIT 7, TRUMPERS WAY, HANWELL W7 2QA. Telephone: 01-843 9903.**

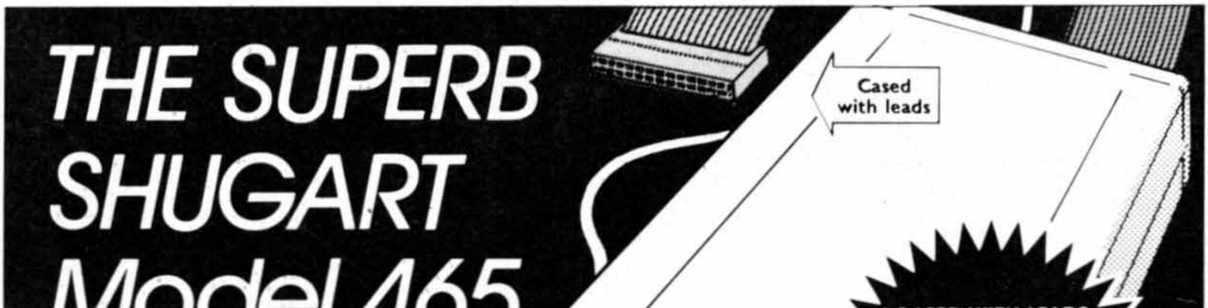
Please send me ______ I enclose Cheque/P.O. for £ ______
I prefer to pay by ACCESS/BARCLAYCARD* (Delete whichever is not applicable)
Card No ______
Signature ______
Name ______
Address ______

mu11

# OUTSTANDING OFFER from Viglen

## THE SUPERB SHUGART Model 465

*Made in Japan by PANASONIC*


Cased
with leads
CASED WITH LEADS
£99
INCLUDING VAT
400K 40/80
SWITCHABLE
SWITCH
40 80
Track switch on rear panel
Viglen
DRIVE 0

At Viglen's rock bottom prices, everyone can afford to replace inefficient cassette tape units and obtain all the advantages of changing up to discs.

### All offers include:

**Utilities Disk** includes formatting, verifying, BASIC program comparator, disassembler, Epson screen dump, dual catalogue (giving 62 files), large printing and many other features.

**Comprehensive Manual** – a fact-filled, 56 page document, includes techniques of loading from cassette to disk. Not available elsewhere.

**Carriage:** Add £12 in each case. Orders usually despatched next day. Price covers courier delivery and VAT.

Prices correct at time of going to press. Offer subject to availability.

**Single Drives 40/80 400K**

| | |
|---|---|
| Single Drive......... | £99 |
| Drive + Acorn DFS (DNFS)... | £159 |

*Prices include VAT*

**Dual Drives 40/80 800K**

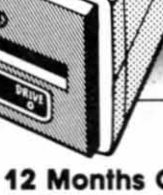
| | |
|---|---|
| Dual Drives ........ | £198 |
| Dual Drive + Acorn DFS (DNFS)... | £258 |
| Integral PSU for Dual Drive....... | £28 |

*Prices include VAT*

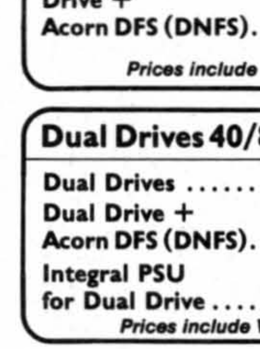
**12 Months Guarantee**

**Call in at our showrooms for Free Fitting of DFS.**

Unit 7, Trumpers Way, off Boston
Road, Hanwell, W7 2QA.
**Tel: 01-843 9903**
Open Moday-Friday 9.30-5.30
Saturday 9.30 – 4.00


UXBRIDGE RD.
A4020
BOSTON MANOR
BOSTON RD
A3002
M4
GREAT WEST RD
A4

free parking


Viglen
Viglen
Viglen
Viglen

*The best partners for your computer*

Post to: Viglen Computer Supplies, Unit 7, Trumpers Way, Hanwell W7 2QA.

Please send me (specify all items)

Add £12 carriage

I enclose Cheque/P.O. for £

Cheques payable to Viglen Computer Supplies

Name

Address

I prefer to pay by ACCESS/BARCLAY CARD (Delete whichever is not applicable)

Card No.

Signature

MU11

Credit Cards valid only if signed by card holder Address must be the same as card holder

# A VERY SPECIAL OFFER from Viglen

LATEST

## The Superb Mitsubishi 400K Model M4853 Double-sided 40/80 Track Disc Drive

Viglen
Cased with leads

## £125

(400K 40/80 TRACK)

INC. VAT

12 MONTH WARRANTY (EXTENDED 2 YEAR WARRANTY AVAILABLE

### PLUS CHOICE OF DFS'S

Viglen DFS 1·2 fully Acorn Compatible

**Features** ● Built in Formatting
**Extras** ● Built in verification ● Dual catalogue 60 files
● Double stepping reads and writes 40 track

**OR** latest Acorn 1·2 DFS (DNFS) Call at factory for free fitting.

| Single Drives 40/80 400K | |
|---|---|
| **Single Drive** | **£125.00** |
| **Drive + Viglen DFS** | **£185.00** |
| **Drive + Acorn DFS** | **£185.00** |

| Dual Drives 40/80 800K | |
|---|---|
| **Dual drives** | **£250.00** |
| **Dual drive + Viglen DFS** | **£309.00** |
| **Dual drive + Acorn DFS** | **£309.00** |
| **Integral PSU for Dual Drive** | **£28.00** |

**Carriage.** Add £12 in each case. Usually despatched next day. Price covers courier-delivery and insurance. Prices include VAT.
*Prices correct at time of going to press – Offer subject to availability.*

### All offers include

**Utilities Disk** includes formatting, verifying, BASIC program comparator, disassembler, Epson screen dump, dual catalogue (giving 62 files), large printing and many others.

**Comprehensive Manual**
a fact-filled, 56 page document, includes techniques of loading from cassette to disk.
Not available elsewhere

VISA

**Sales Hotline 01-843 9903**

Please call for latest prices, product details and to place credit card orders.
Government & Educational Establishments enquiries welcome on this number.

**After Sales Line 01-571 6313**

For dispatch enquiries, invoice queries, service and all other enquiries.

**Call in at our Showroom**
Weekdays:
9.30-5.30
Saturdays:
9.30-4

Post to: Viglen Computer Supplies, Unit 7, Trumpers Way, Hanwell W7 2QA.
Please send me (specify all items) ______ Add £12 carriage
I enclose Cheque/P.O. for £ ______
Cheques payable to Viglen Computer Supplies
Name ______
Address ______
I prefer to pay by ACCESS/BARCLAY CARD
(Delete whichever is not applicable)
Card No. ______
Signature ______
MU11
Credit Cards valid only if signed by card holder
Address must be the same as card holder

ACORNSOFT
VIEW
Guide
A guide to the VIEW Word Processor for the BBC Microcomputer
A database manager for the BBC Microcomputer
VIEWSTORE
ACORNSOFT
An electronic spreadsheet for the BBC Microcomputer
VIEWSHEET
User Guide

# Get the whole VIEW family for your micro – it's never been cheaper!

HERE'S your chance to obtain Acornsoft's View, ViewSheet and ViewStore – the sophisticated word processor, spreadsheet and database combination – at absolutely unbeatable prices.

The View family of chips is rapidly becoming the foremost data processing system for the BBC Micro. Totally ROM based, they transform your micro instantly into a spreadsheet, wordprocessor or database manager.

Each of these is an exceptionally powerful program in its own right, designed to the highest professional standards. Yet combined with this power is simplicity of use and extreme flexibility.

However, the real strength of the View system lies in the total integration of one program with another. For example, screens created with ViewSheet can be loaded into View quickly and without fuss – allowing you to incorporate figures and projections into your own, high quality word processed documents.

Similarly, ViewStore allows you to produce macros for use in View, and files for use in ViewSheet.

Whatever your interest – businessman, writer, club secretary or harassed family man – wherever organisation, planning and clear communication are essential, you'll find this powerful trio invaluable.

And we can offer them to you at the lowest prices ever. Buy any two for £99.60, which gives you a saving of at least £14 off the recommended price. Buy all three and you **save £29.41.** Individual prices are £52.80 for View or ViewSheet and £54.80 for ViewStore. ***And there are absolutely no hidden extras. All prices include postage, packing and VAT!***

It's an offer you mustn't miss. And don't forget, the View system is constantly growing in scope and capability. So watch this space for exciting special offers on other members of the View family . . .

## Getting started in BBC Basic

Based on the highly praised series for beginners in *The Micro User*, 'Getting started in BBC Basic' takes the reader through the fundamentals of writing programs.

Its hands-on approach has been specifically designed to teach the absolute novice not only the formal rules of Basic but also that elusive quality – good programming style.

By working through its many examples, the reader will gain a clear insight into structured programming and will quickly acquire the ability to use structured techniques in creating his own programs.

Getting started in
BBC Basic
on the BBC Micro & Electron
DATABASE PUBLICATIONS

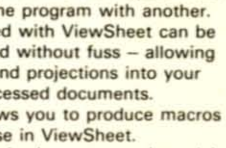
**£5.95**

## Getting started in Sound & Graphics

'Getting started in Sound & Graphics' shows you how to harness the power of your micro to create dazzling displays and superb sound.

In this compilation of their highly praised series of articles in *The Micro User*, Michael Noels, Paul Jones and Nigel Peters explore the BBC Micro's outstanding sound and graphics capabilities.

Assuming only a rudimentary knowledge of Basic, the authors thoroughly explain all the programming methods involved, ranging from the simplest to the most complex.


THE MICRO USER
GETTING STARTED IN
Sound & graphics
on the BBC Micro
Paul Jones
Nigel Peters
Michael Noels
DATABASE PUBLICATIONS

**£5.95**

***Use the special order form on Page 9 – No stamp needed!***

It's our greatest offer ever!

## TWO of the most popular of all games for the BBC Micro can be yours – FREE!

**They were games that shot straight to the top of the software charts the moment they were released – and they've been breaking records ever since.**

**Now A 'n' F Software's CHUCKIE EGG and CLYLON ATTACK are being given away absolutely free of charge with every new subscription or renewal to *The Micro User*.**

**The two games, which have now achieved the status of micro classics, are available to our subscribers on the same cassette. But only if you complete the subscription or renewal section of the order form on Page 199.**

*If you already have a subscription which does not expire for several months you can renew early in order to benefit from this exceptional offer.*

BBC 32K
CHUCKIE EGG™
BBC 32K
CYLON ATTACK™

**WORTH £15 – but they can be yours FREE!**

## Don't miss these BIG bargains!

**Selected sale items from**

### THE BEEB BODY BUILDING COURSE

50% OFF MANY ITEMS!

| | Previous price | NOW |
|---|---|---|
| ***Kit packs:*** | | |
| *No. 3. Dual cassette system* | £9.95 | **£4.99** |
| *No. 4. 4 amp mains control* | £9.95 | **£4.99** |
| *No. 7. Pendulum behaviour/capacitor discharge experiments* | £15.50 | **£7.75** |
| *No. 8. Sound to pattern converter* | £16.55 | **£8.25** |
| *No. 9. Real time clock* | £28.50 | **£14.25** |
| *No. 11. Pulse rate monitor* | £19.00 | **£9.50** |
| *No. 12. Stepping motor control* | £24.95 | **£12.50** |
| *No. 14. Acoustic coupler* | £59.95 | **£29.99** |
| ***Assembled packs:*** | | |
| *Light pen* | £18.35 | **£14.99** |
| *Sound to pattern converter* | £22.30 | **£17.99** |
| *Real time clock* | £31.00 | **£24.99** |
| *Pulse monitor* | £25.50 | **£19.99** |

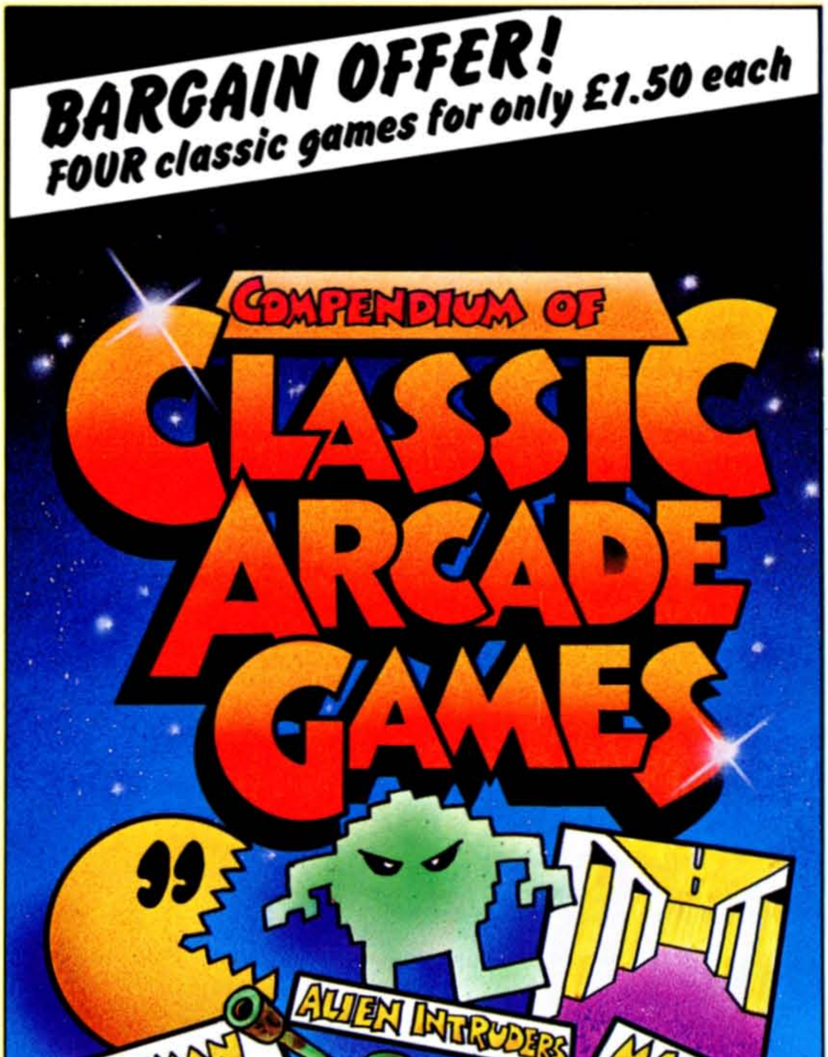
## ATARI Trak-Ball

Roll into action with the new ATARI TRAK-BALL for your BBC Micro. Turn tighter corners, zero in on video villains faster and blast 'em more accurately! Works with any joystick game. Capture the ultimate in arcade action and excitement at home.

TRAK-BALL
ATARI

| | Previous price | Sale price |
|---|---|---|
| Trak-Ball | £19.99 | **£14.99** |
| With kit pack 19 (CAD) | £37.94 | **£27.99** |
| With assembled pack 19 (CAD | £43.94 | **£32.99** |
| With kit pack 20 (Games) | £39.95 | **£29.99** |
| With assembled pack 20 (Games) | £45.95 | **£34.99** |

# Here's something SPECIAL from THE MICRO USER


BARGAIN OFFER!
FOUR classic games for only £1.50 each
COMPENDIUM OF
CLASSIC ARCADE GAMES
SNAPMAN
ALIEN INTRUDERS
MAYDAY
PANZER ASSAULT

**One of our most popular offers is this set of four rip-roaring games for the Electron and BBC Micro**

**Three of this high-powered collection are top-rate machine-code versions of arcade classics and the fourth is a thrilling real-time adventure game. There's hours of enjoyment and something to suit everyone in this unique value for money collection**

**SNAPMAN** – Guide your man through the maze as he munches energy pellets and avoids hostile aliens.

**ALIEN INTRUDERS** – With only your laser for protection you must destroy the waves of aliens who threaten to engulf you.

**PANZER ATTACK** – You are a tank commander engaged in vicious combat against encircling enemy forces.

**MAYDAY** – A futuristic adventure! As captain of an interstellar cruiser you must guide the sole survivor of a stricken space freighter through the wreckage of his craft. If you fail to recover those vital medical supplies a whole planet is doomed!

## Give your micro the power of SPEECH!

**You've heard of computer feedback, now try computer talkback with our low cost offer on the official Acorn speech extension.**

- ★ 164 words and word parts from which you can construct your own new sounds with ease.
- ★ Simple to use from Basic – each word is called via its own unique reference number used with the SOUND –1 command.
- ★ Quick and easy to install. For full speech capability simply insert two chips. (Also included is a socket for plug in cartridges. This will require a little skill at soldering, but is not necessary for the basic speech function.)
- ★ Suitable for all BBC Micros with Version 4 boards or later. (Pack includes technical details on how to modify earlier versions.)
- ★ Easy-to-understand instruction manuals included.
- ★ A decent British accent – Kenneth Kendal at his best.

SAVE £25 off the recommended retail price of £55

***At only £29.95 it's an offer you really shouldn't miss. Make sure of yours today.***

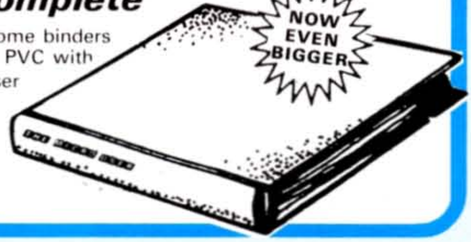
## Your BBC Micro needs protecting!

ONLY £3.95

Our luxury dust cover is made of soft pliable water-resistant transparent vinyl, bound with strong cotton and decorated with the *Micro User* logo in black.

## Keep your copies neat and complete

NOW EVEN BIGGER



These handsome binders are bound in PVC with the Micro User logo in gold blocking on the spine.

**£4.25**

## Upgrade to Basic II for a very special price!

ONLY £23.50

### This is what you get with Basic II:

- More accurate calculations.
- An extra file handling command, OPENUP.
- The invaluable OSCLI command, allowing you, for example, to *LOAD files with a variable as the file parameter.
- EVAL will work with PAGE, HIMEM and other pseudo-variables.
- The INSTRing bug has been corrected.
- More efficient handling of string memory.
- EQUB, EQUD and EQUW – invaluable in assembler.
- 0% combined with extra values of OPT to enable offset assembly.

**Don't miss this exceptional offer**

**The Advanced User Guide** *is the essential companion for the BBC Micro . . . with 512 information-packed pages*

Featured in its 512 pages are:
- ★ the BASIC Assembler
- ★ 6502 machine code reference section
- ★ complete descriptions of all FX calls
- ★ BBC memory usage and vectors explained
- ★ full interfacing details for the user port, tube, analogue port, 1 MHz bus
- ★ paged ROMs explained ★ and lots, lots more.

With many examples to illustrate the text, this guide is the indispensable reference work for the serious BBC Micro programmer.

**£11.50**

The October issue of *The Micro User* has as its game of the month **Karate,** a clever martial arts simulation, ably supported by a colourful version of Solitaire.

A comprehensive screen scrolling utility allows you to get your own message across in enlarged, colourful text.

Acornsoft's P-System is given good coverage and there is the start of a 3-part series on debugging and a routine to fill the gap left by BBC Basic's missing ON PROC command.

On the ROM front, A 'n' F Software's 16k Slave toolkit is reviewed, along with Resource Facilities machine code monitor and a screen handler from Microsolve.

THE MICRO USER

## *Bibliography on disc*

### 40 track 5¼" disc

| | | |
|---|---|---|
| *2225* | March '83 to Aug '84 | £7.95 |
| *2298* | Sept '84 to April '85 | £7.95 |

Updates of disc *2298* will be available at £3 by returning your 5¼" disc.

### 3" disc

| | | |
|---|---|---|
| *2227* | March '83 to Aug '84 | £9.95 |
| *2299* | Sept '84 to April '85 | £9.95 |

Updates of disc *2299* will be available at £3 by returning your 3" disc.

### 80 track 5¼" disc

| | | |
|---|---|---|
| *2226* | March '83 to April '85 | £11.95 |

Updates of existing 80 track discs are available at £3 by returning your 5¼" disc and subsequent updates will be available at the same price in future months until the disc is full (estimated to include February '86 issue).

# Educational Computing on the BBC Micro

## *24 FULL LENGTH programs in two separate packs, designed to stimulate, educate and entertain – both in school and at home*

THE MICRO USER
Education Special
Classroom Computing on the BBC Micro
15 full length programs to stimulate, educate and entertain ...in school and at home
Complete listings with full details of how they can be easily adapted to cater for individual needs
PLUS A-Z guide to educational software

### Volume 1 contains:

***Tuadd, Tusub, Tumult:*** *Elementary maths.* ***Calculator:*** *Sums at a stroke.* ***Table Mountain:*** *Fun tables.* ***Gottit:*** *Word guessing for two.* ***House:*** *Word, number and colour recognition.* ***Gallery:*** *A typing tutor.* ***Whatnumber:*** *Strategy number game.* ***Bridge Breaker:*** *Hangman with a difference.* ***Snap:*** *Letter and number recognition.* ***Manipulation:*** *Thought provoking maths game.* ***Matrices:*** *Matrix manipulation.* ***Hidden answers:*** *The principles of mapping.* ***Curvefit:*** *Drawing lines of best fit.*

| Education Special Volume 1 | |
|---|---|
| Magazine | £1.95 |
| Cassette | £5.95 |
| Cassette and Magazine | £7.00 |
| 5¼" Disc | £7.95 |
| 5¼" Disc and Magazine | £8.95 |
| 3" Disc | £9.95 |
| 3" Disc and magazine | £10.95 |

To satisfy the increasing demand for high quality educational software on the BBC Micro – particularly for the younger age group – two superb packages are now available from *The Micro User*.

The Micro User Education Special, Volumes 1 and 2, contain between them 24 full length programs, written to the highest standards, and each picked to combine educational worth with sheer enjoyment.

The 15 programs in Volume 1 range in scope from pre-reading to sixth form maths. Volume 2, with nine programs, covers topics from early reading and simple sums to the rules of punctuation and angle estimation – and there's an excellent introductory database.

All necessary instructions are contained within the programs themselves, but more detailed descriptions can be found in Volumes 1 and 2 of the Micro User Educational Special magazine.

These contain complete listings of all the programs together with advice on how they can be adapted to cater for individual needs.

***SPECIAL OFFERS:***
Both Cassettes and Magazines for £10
Both 5¼" Discs and Magazines for £14
Both 3" Discs and Magazines for £18

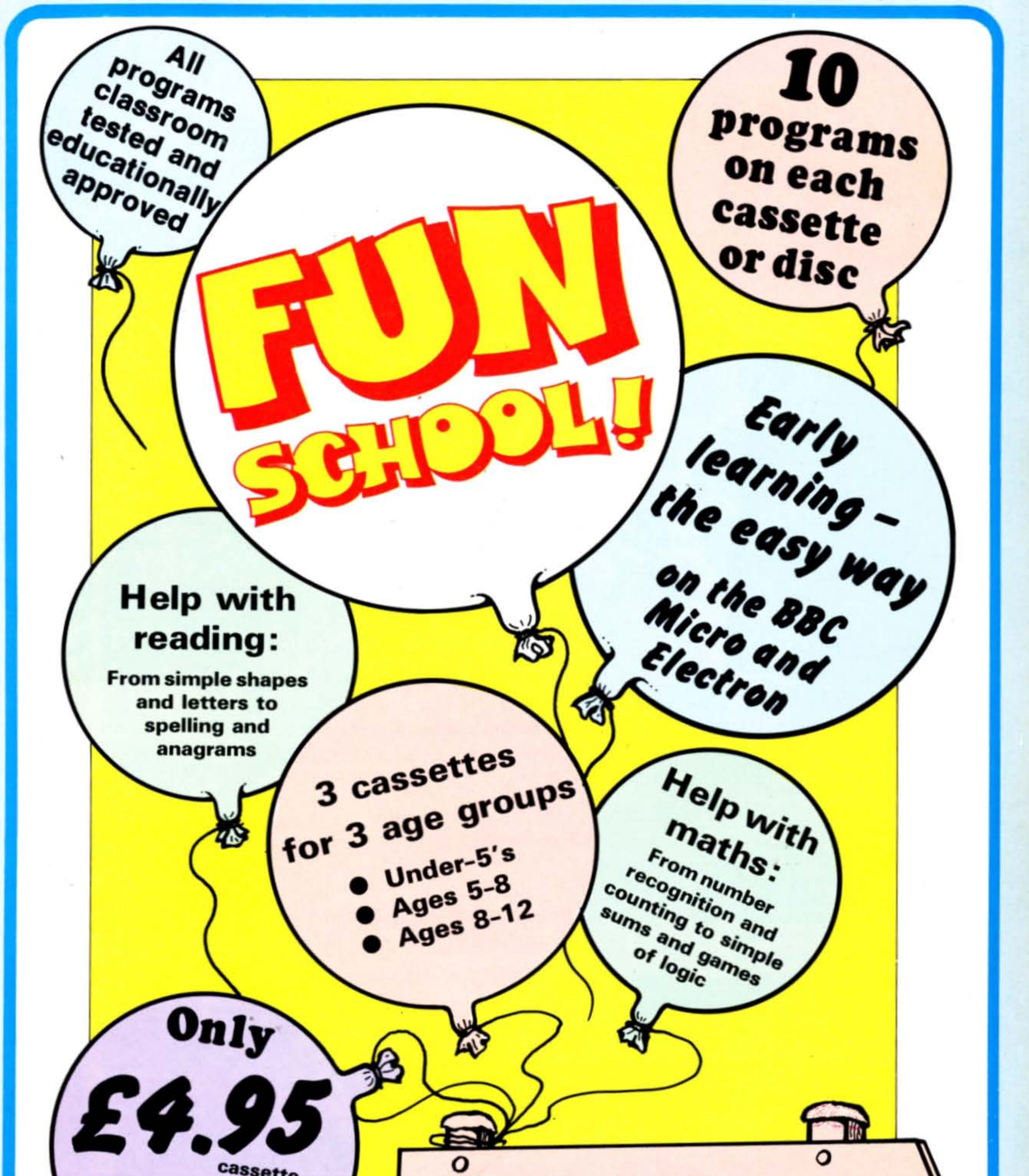
THE MICRO USER
Education Special
Logo on the BBC Micro
An in-depth study of the learning language
Programs to help with early reading · spelling · factors punctuation · angles · simple sums
DIY DATABASE FOR JUNIORS
15 software packages reviewed
9

### Volume 2 contains:

***Fun Factors:*** *Arcade style factor learning.* ***Windmill:*** *Word, number and colour recognition.* ***Angler:*** *Angle estimation fun.* ***Spelldroid:*** *Learn to spell with our friendly robot.* ***Tortal:*** *Teach and test the rules of simple addition.* ***Discovery:*** *A strategy based phrase identification game.* ***Punctuation:*** *Test and teach the rules of punctuation.* ***Junior Database:*** *A comprehensive database for the young learner.* ***Chinese Takeaway:*** *Teach and test the rules of simple subtraction.*

| Education Special Volume 2 | |
|---|---|
| Magazine | £1.50 |
| Cassette | £4.95 |
| Cassette and Magazine | £6.00 |
| 5¼" Disc | £6.95 |
| 5¼" Disc and Magazine | £7.95 |
| 3" Disc | £8.95 |
| 3" Disc and Magazine | £9.95 |

***Use the special order form on Page 9 – No stamp needed!***



# FUN SCHOOL!

All programs classroom tested and educationally approved

10 programs on each cassette or disc

Early learning – the easy way on the BBC Micro and Electron

**Help with reading:**

From simple shapes and letters to spelling and anagrams

**3 cassettes for 3 age groups**

- Under-5's
- Ages 5-8
- Ages 8-12

**Help with maths:**

From number recognition and counting to simple sums and games of logic

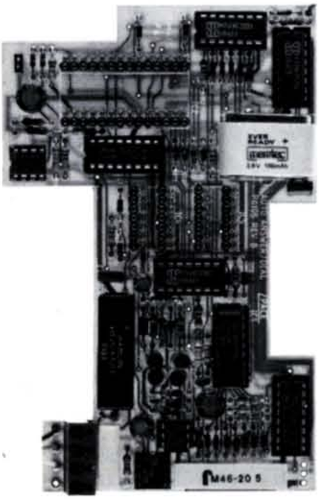
Only £4.95 cassette

£6.95 5¼" Disc

£8.95 3" Disc

Use the special order form on Page 200. No stamp needed.

# Upgrade your Nightingale modem



**The Pace Nightingale modem has been one of the most popular products ever offered by *The Micro User,* enabling thousands of readers to enter the exciting world of communications. Now comes the Nightingale Accessory Board, giving this best-selling modem for the BBC Micro lots of extra power!**

- ★ AUTO-DIAL: Let your micro do the phoning! Includes comprehensive software featuring multiple directories, automatic log-on and repeat dialling.
- ★ Call monitoring through on-board loudspeaker.
- ★ BT approval applied for.
- ★ AUTO-ANSWER: Full technical specifications provided for your own implementations. Also supports OBBS bulletin board software.
- ★ Easy to install – simply plug it into your modem. No soldering needed.

SPECIAL OFFER!

**£57.85**

*For those readers who haven't yet discovered the excitement of linking the BBC Micro into the telephone, we are still able to offer the combination of Nightingale and Commstar at a specially reduced price. The Nightingale multi baud rate modem is fully BT approved. With the Commstar communications ROM it is all you need to access MicroLink, Prestel/Micronet and bulletin boards throughout Britain and overseas.* ***Nightingale/Commstar package only £135.95 and with autodial/autoanswer is only £188.80 – a further saving of £5!***

## Add 29 EXTRA star commands to your BBC Micro with A 'n' F's

# SLAVE

**There's a choice selection of utilities packed into this 16k ROM.**

- *For the Basic programmer there are 13 routines, from 'Bad program' recovery to a dynamic Basic editor.*
- *Machine code programmers will find 12 versatile commands, ranging from moving blocks of memory to a versatile disassembler.*
- *Plus four vital utilities for disc users: find string or bytes, sector editor, report free space, and cyclic redundancy check.*

**Altogether it adds up to an incredibly powerful package that should be in every serious user's BBC Micro.**

16k UTILITY EPROM
BBC MODEL B
The
SLAVE DRIVERS GUIDE

**"... an outstanding utility chip worthy of a sideways ROM slot in your machine"** – *The Micro User, October 1985.*

*The ROM comes with this fully detailed 72-page manual showing how easy it is to use.*

**Normal price: £39.95**

**OUR PRICE: £24.95**

BBC MICRO USER
BBC MICRO USER
SPACE PILOT
THE MICRO USER
FRUITIES
and other programs listed in the
THE MICRO USER
Robin and
THE MICRO USER
GONE FISHIN'
and other programs listed in the pages of the Micro User
THE MICRO USER
Goblins and Blackjack
THE MICRO USER
Tower Bridge
and other programs listed in the pages of the Micro User Vol. 1, No. 10
THE MICRO USER
THE MICRO USER
CASTLE OF FEAR
FOR BBC MODEL B
and other programs from the pages of The Micro User Vol 2 No. 6

# ALL the programs from The Micro User from Day One are now on tape and disc!

**MARCH 1983: Deathwatch,** Bingo and other programs from Vol. 1, No. 1.
**APRIL: King Kong, Nim,** and other programs from Vol. 1, No. 2.
**MAY: Air Strike, Pelmanism, Anagrams,** and other programs from Vol. 1, No. 3.
**JUNE: Space Pilot, Nomism,** and other programs from Vol. 1, No. 4.
**JULY: Tenpin, Spacepods,** and other programs from Vol. 1 No. 5.
**AUGUST: Fruities, Animation,** and other programs from Vol. 1 No. 6.
**SEPTEMBER: Robin & Marian, Galactic Invaders** and other programs from Vol. 1 No. 6.
**OCTOBER: Fishing, Joykey** and other programs from Vol. 1 No. 7.
**NOVEMBER: Goblins, Blackjack** and other programs from Vol. 1 No. 8.
**DECEMBER: Tower,** rescue treasure. **Santa,** help Father Christmas. **VDU 23,** character definer. **Paged,** graphic techniques. **Plus** all the listings from the third issue of Electron User.
**JANUARY 1984: Barrels,** arcade game. **Noteplay,** musical utility. **Dump1** and **Dump2,** multitone screen dumps. All the programs from our **Sound, Beginners'** and **Graphics** articles. **Plus** 12 programs from the fourth Electron User.
**FEBRUARY: Invasion,** arcade game. **Frogs,** family fun. **Balance,** number learning. **Key,** single key entry. **Plus** nine other programs from *The Micro User*.
**MARCH: Mazemunch,** arcade action. **Birthday,** family fun. **Derrick,** number fun. **Pixelpen,** high resolution.
**APRIL: Microgolf,** the simulation. **Eastermaze** and **April Fool,** seasonal games. **Seawall** and **Magic Square,** maths fun. **Filer** and **Album,** sounds database. **TRX1, TRX2, RS423** driver. **Heartrate,** fitness monitor.
**MAY: Dug Dig,** asteroid adventures. **Damraider,** naval action. **Envaid,** easy envelopes. **Steppers,** Body Building. **Spiro,** graphics windows. **Adventure,** a trapdoor maze. **Renumber,** program utility. **Bigletter,** large type. **Memory,** RAM efficiency.
**JUNE: Roadracer,** 3D action. **Quadline,** four-in-a-line. **Monitor,** debugging routines. **Toolkit,** 8271 explored. **Areas,** easy maths. **Spell,** spelling education.
**JULY: Doomrun,** deep space drama. **Backgammon,** the board game. **Keys,** user defined key editor. **Save?** and **Tidisk,** disc utilities. **Alice1** and **Alice2,** mini-adventures. **Terminal1** and **Terminal2,** communication programs. **Acoustic,** software and Body Build Modem.
**AUGUST: Castle,** enthralling adventure. **Gridman,** a high speed strategy. **Tedit,** Teletext editor. **Dsquare,** number fun. **Dedit,** disc editor. **Input,** the ultimate input routine. **Bells,** Alice's mini-adventure.

All our discs incorporate an automatic downloader. Just boot up the disc, make a choice from the menu – and away you go!

Save wear on your fingers and ensure all your programs are error-free by using our monthly tapes or discs. They are only:

**£4.25 cassette**
**£6.25 $5\frac{1}{4}''$ disc**
**£8.25 3" disc**

You can also take out a year's subscription and have them posted to you each month.

**Cassette £40**
**$5\frac{1}{4}''$ disc £60**
**3" disc £80**

**SEPTEMBER: Villains,** save your crystals. **Rollerball,** game of strategy. **Microterm,** comms terminal. **T/Textdump,** Mode 7 screen dump. **Numbersign,** number skills.
**OCTOBER: Wampus,** explore the labyrinth. **Balloon,** escape the Goulogs. **Splits,** split screen utility. **Pageram,** paged RAM programs. **Input1/2,** inputs for the disabled. **Morecol,** extended colours. **D/A,** waveform generator. **Integer,** direct addressing speed.
**NOVEMBER: Buster,** line up the diamond blocks. **Duel,** two player action. **Seaside,** picture fun for the young. **M7letters,** teletext large letters. **Dscload,** loading disc files to &E00. **6502,** second processor programs. **Synth,** musical Body Building programs.
**DECEMBER: Painter,** paint the pyramid. **Miner,** delve into the depths. **Snowvad** and **Carol,** seasonal programs. **Garden,** shape-matching. **Medit,** memory editor. **Catalog** and **Save,** disc utilities. **Ladders,** mini-adventure. ***Plus Omega Probe – a machine code game.***
**JANUARY 1985: Rover,** guide our retriever. **Backgammon,** two player version. **Matchwood,** shape recognition. **Messages,** machine code printing. **Speedtext,** display text at different rates. **Search,** a powerful tool. **Second processor,** Body Building and graphics routines. ***Plus Galactic Tycoon, our superb free game.***
**FEBRUARY: Helicopter Dogfight,** two player action. **Craal,** dungeon adventure. **Pilot,** the language. **Riddle,** first Pilot program. **Disdump,** the ultimate disassembler. **Talker,** speech chip utility. **Change,** program tidier. **In/out** – output from assembler. ***Plus Atomic Protector – a machine code game.***
**MARCH: Astromines,** space action. **Castle,** two player catapult battle. **Data Maker,** take the tedium out of entering Data. **Disc Search,** string search utility. **Command,** give your BBC and Epson printer the same character set. **Break Key,** disable Break. ***Plus Flex – a machine code game.***
**APRIL: X15,** sideways-scrolling spectacular. **Mornington Crescent,** fun on the London underground. **Calculator,** AMX mouse mathematics. **Dithering,** colour mixer. **Chatterbox,** speech chip procedures. ***Plus Rabbit Run – a machine code game.***
**MAY: Stellar Rescue,** arcade action. **Dominoes,** simulation. **Plot69,** fast Mode 2 plot routine. **Musical Events,** a music interrupt utility. **Pound and Hash,** an Epson printer routine. **Sheila,** micro slide show.
**JUNE: Othello,** simulation. **Activities,** word association. **Catnap,** arcade enjoyment. **Simon Quackers,** lightpen game. **Shape recognition,** teach your micro to identify. **Stripper,** a routine for removing line numbers. **Epson,** a type-setting utility. **Lprint,** simplifies string output. **Eval,** the Basic command from machine code.
**JULY: Fly,** an arcade spectacular. **Draughts,** a superb version. **Compox,** 3D noughts and crosses. **Double Height,** large characters in Modes 0-6. **Clock,** alarm utility. **Compacter,** compress Mode 2. **Inside Basic,** basic routines in machine code. **RAMpage and RAMsave,** sideways RAM utilities. **Video,** graphics to music.
**AUGUST: Harbour Command,** protect a Cornish town. **Fruit Machine,** a gambler's favourite. **Mouse Organ,** AMX mouse music utility. **Flash,** alternative flashing colours. **String Formatter,** prevent end of line word splitting. **M/C Games,** random number and key detection routines.
**SEPTEMBER: Ball Lightning,** tame the escaped lightning. **Quarters,** mind bending game of skill. **6502 Games,** a simple arcade game. **Variable Lister,** keep track of your variables. **Smiley Hunt,** Al's mega-game. **Error handling,** the vital routines.
**OCTOBER: Karate,** superb arcade action as you learn and put into practice the deadly martial art. **Solitaire,** on your own? Fill the lonely hours with our version of the all-time favourite. **Scroller,** get the message across in fine colourful style with this superb text scroll utility. **Case,** a clever program to make up for the lack of an ON PROC command. **Disc Scan,** an aid to search for those old disc files whose name you can never remember. **Adventure,** can you row to safety and avoid the attentions of the vampire?
**NOVEMBER: Whodunnit,** can you solve the intriguing murder mystery at Thaxford Manor. **Gloop Gulp,** zany arcade action as you steer the Gulper against the spreading Green Gloop. **Basic Analyser,** take the drudgery of debugging your programs. **Wordwise F/keys,** get the most from your word processor using the function keys. **Sideways,** a simple but effective sideways screen clear. **New Modes,** a utility to reveal Modes 8, 9 and 10. **Disabler,** prevent star command clashes by switching off any ROM.

***Special Offers!***

- Any five of our monthly tapes for only £15.
- All 10 tapes from the 1983 issues for only £25.

THE MICRO USER
THE MICRO USER
THE MICRO USER
THE MICRO USER
ROVER
THE MICRO USER
THE MICRO USER
THE MICRO USER
X-15
FOR BBC MODEL B
THE MICRO USER
STELLAR
THE MICRO USER
OTHELLO
THE MICRO USER
Mutant FLY
THE MICRO USER
BATTLE FOR HARBOUR COMMAND
THE MICRO USER
BALL LIGHTNING
and other programs from the pages of The Micro User Vol. 3 No. 7
FOR BBC MODEL B

## Disc Upgrade Service

Send your tape complete with inlay card and instructions as supplied and your cheque for £3 (tape to $5\frac{1}{4}''$) or £5 (tape to 3") (not credit card number) with a covering letter stating what is required.

# THE MICRO USER MAIL ORDER OFFERS ORDER FORM

*Overseas orders:*
*ALL GOODS NOW SENT AIRMAIL!*

*Valid to November 30, 1985*

*Please tick items required in box below £ p*

## *Micro User back issues*

| | | |
|---|---|---|
| March 1983 £1 | *2009* | ☐ |
| April 1983 £1 | *2010* | ☐ |
| May 1983 £1 | *2011* | ☐ |
| June 1983 £1 | *2012* | ☐ |
| July 1983 £1 | *2013* | ☐ |
| Aug 1983 £1 | *2014* | ☐ |
| Sept 1983 £1 | *2015* | ☐ |
| Oct 1983 £1 | *2016* | ☐ |
| Nov 1983 £1 | *2017* | ☐ |
| Dec 1983 £1 | *2018* | ☐ |
| Jan 1984 £1 | *2019* | ☐ |
| Feb 1984 £1 | *2020* | ☐ |
| Mar 1984 £1 | *2021* | ☐ |
| April 1984 £1 | *2022* | ☐ |
| May 1984 £1 | *2023* | ☐ |
| June 1984 £1 | *2024* | ☐ |
| July 1984 £1 | *2025* | ☐ |
| Aug 1984 £1.25 | *2026* | ☐ |
| Sept 1984 £1.25 | *2027* | ☐ |
| Oct 1984 £1.25 | *2028* | ☐ |
| Nov 1984 £1.25 | *2029* | ☐ |
| Dec 1984 £1.25 | *2030* | ☐ |
| Jan 1985 £1.25 | *2031* | ☐ |
| Feb 1985 £1.25 | *2032* | ☐ |
| Mar 1985 £1.25 | *2033* | ☐ |
| April 1985 £1.25 | *2034* | ☐ |
| May 1985 £1.25 | *2035* | ☐ |
| June 1985 £1.25 | *2036* | ☐ |
| July 1985 £1.25 | *2037* | ☐ |
| Aug 1985 £1.25 | *2038* | ☐ |
| Sept 1985 £1.25 | *2039* | ☐ |
| October 1985 £1.25 | *2040* | ☐ |

UK. Add p&p 80p per copy (5 or more £3.20) ....................
Europe (surface mail). Add p&p £1.50 per copy ..................
Overseas (air mail). Add p&p £2.00 per copy ....................

>>>

**EDUCATION SPECIAL No 1**

| | | | |
|---|---|---|---|
| Magazine only | £1.95 | *2210* | ☐ |
| Cassette only | £5.95 | *2211* | ☐ |
| Cassette + Magazine | £7.00 | *2212* | ☐ |
| Disc (40T) only | £7.95 | *2213* | ☐ |
| Disc (40T) + magazine | £8.95 | *2216* | ☐ |
| Disc (80T) only | £7.95 | *2214* | ☐ |
| Disc (80T) + magazine | £8.95 | *2217* | ☐ |
| Disc (3") only | £9.95 | *2215* | ☐ |
| Disc (3") + magazine | £10.95 | *2218* | ☐ |

**EDUCATIONAL SPECIAL No 2**

| | | | |
|---|---|---|---|
| Magazine only | £1.50 | *2320* | ☐ |
| Cassette only | £4.95 | *2321* | ☐ |
| Cassette + Magazine | £6.00 | *2322* | ☐ |
| Disc (40T) only | £6.95 | *2323* | ☐ |
| Disc (40T) + magazine | £7.95 | *2328* | ☐ |
| Disc (80T) only | £6.95 | *2324* | ☐ |
| Disc (80T) + magazine | £7.95 | *2315* | ☐ |
| Disc (3") only | £8.95 | *2325* | ☐ |
| Disc (3") + magazine | £9.95 | *2316* | ☐ |
| *Both cassettes and magazines* | £10 | | |
| *Both 5¼" discs and magazines* | £14 | | |
| *Both 3" discs and magazines* | £18 | | |

## *Beeb Body Build course*

| | | | |
|---|---|---|---|
| **Kit Packs** | | | |
| No. 3 Dual cassette system | £4.99 | *2265* | ☐ |
| No. 4 4 amp mains control | £4.99 | *2266* | ☐ |
| No. 7 Pendulum behaviour/capacitor discharge | £7.75 | *2269* | ☐ |
| No. 8 Sound to pattern converter | £8.25 | *2270* | ☐ |
| No. 9 Real time clock | £14.25 | *2271* | ☐ |
| No. 11 Pulse rate monitor | £9.50 | *2273* | ☐ |
| No. 12 Stepping motor control | £12.50 | *2274* | ☐ |
| No. 14 Acoustic coupler | £29.99 | *2276* | ☐ |
| **Assembled packs:** | | | |
| Light pen | £14.99 | *2280* | ☐ |
| Sound to pattern converter | £17.99 | *2281* | ☐ |
| Real time clock | £24.99 | *2282* | ☐ |
| Pulse monitor | £19.99 | *2284* | ☐ |

Add p&p per item £1 UK; £3 overseas

>>>

## *Annual subscription*

| | | |
|---|---|---|
| UK & Eire (Sterling only) £15 | *2001* | ☐ |
| Europe £25 | *2003* | ☐ |
| Overseas £45 | *2004* | ☐ |
| *FREE Chuckie Egg/Cylon Attack tape* | *2329* | ☐ |

Tick box if
☐ renewal Commence with ................................ issue

## *Annual subscription for cassettes and discs*

| | | |
|---|---|---|
| BBC 'B' cassette £40 | *2005* | ☐ |
| 5¼" disc 40T £60 | *2006* | ☐ |
| 5¼" disc 80T £60 | *2007* | ☐ |
| 3" disc £80 | *2008* | ☐ |

Overseas add £6 postage Commence with .................... (state month)

## *Dust Covers*

£3.95 *2220* ☐

## *Binders*

UK £4.25
Europe £7.25 Overseas £9.25 *2221* ☐

## *A&F Slave ROM*

UK £24.95 *2361* ☐

## *Getting Started in Sound & Graphics*

| | | |
|---|---|---|
| UK - £5.95 | *2223* | ☐ |
| Europe - £7.45 | | ☐ |
| Overseas - £8.45 | | ☐ |

## *Getting Started in BBC Basic*

| | | |
|---|---|---|
| UK - £5.95 | *2289* | ☐ |
| Europe - £7.45 | | ☐ |
| Overseas - £8.45 | | ☐ |

>>>

## *View, Viewsheet & Viewstore*

| | | |
|---|---|---|
| View £52.80 | *2312* | ☐ |
| Viewsheet £52.80 | *2313* | ☐ |
| Viewstore £54.80 | *2337* | ☐ |

UK orders only Any 2 £99.60. All 3 £149.99

## *Basic II Rom*

| | | |
|---|---|---|
| UK – £23.50 | *2219* | ☐ |
| Europe - £24.50 | | ☐ |
| Overseas - £25.50 | | ☐ |

## *The Advanced User Guide*

| | | |
|---|---|---|
| UK - £11.50 | *2245* | ☐ |
| Europe - £15.00 | | ☐ |
| Overseas - £17.50 | | ☐ |

## *Acorn Speech Extension*

| | | |
|---|---|---|
| UK – £29.95 | *2224* | ☐ |
| Europe - £31.95 | | ☐ |
| Overseas - £33.95 | | ☐ |

## *Mini Office*

| | | |
|---|---|---|
| BBC 'B' cassette £5.95 | *2231* | ☐ |
| Electron cassette £5.95 | *3062* | ☐ |
| 5¼" 40T disc £7.95 | *2232* | ☐ |
| 5¼" 80T disc £7.95 | *2233* | ☐ |
| 3" disc £9.95 | *2234* | ☐ |

## *Trak-ball*

(Plus Body Build interface packs)

| | | |
|---|---|---|
| With pack 19 kit £27.99 | *2256* | ☐ |
| With assembled pack 19 £32.99 | *2258* | ☐ |
| With pack 20 kit £29.99 | *2259* | ☐ |
| With assembled pack 20 £34.99 | *2260* | ☐ |
| *Track ball available separately £14.99* | *2254* | ☐ |

Overseas postage add £5.

>>>

***Don't forget to fill in your address overleaf!***

*All prices include postage, packing and VAT*

***TOTAL CARRIED FORWARD OVERLEAF*** ______

# ORDER FORM

THE MICRO USER **MAIL ORDER OFFERS**

***Total carried forward from previous page*** £ p

## *Single copies of cassettes/discs*

☐ Any 5 tapes for £15
☐ All 10 1983 tapes £25

| | | | | 5¼" disc | | |
|---|---|---|---|---|---|---|
| | | | Tape £4.25 | 40 track £6.25 | 80 track £6.25 | 3" disc £8.25 |
| Deathwatch | Mar 1983 | *2045/48* | | | | |
| King Kong | April 1983 | *2049/52* | | | | |
| Air Strike | May 1983 | *2053/56* | | | | |
| Space Pilot | Jun 1983 | *2057/60* | | | | |
| Tenpin | Jul 1983 | *2061/64* | | | | |
| Fruities | Aug 1983 | *2065/68* | | | | |
| Robin & Marian | Sep 1983 | *2069/72* | | | | |
| Gone Fishin' | Oct 1983 | *2073/76* | | | | |
| Blackjack/Goblins | Nov 1983 | *2077/80* | | | | |
| Tower Bridge | Dec 1983 | *2081/84* | | | | |
| Barrel Battle | Jan 1984 | *2085/88* | | | | |
| Alien Invasion | Feb 1984 | *2089/92* | | | | |
| Mazemunch | Mar 1984 | *2093/96* | | | | |
| Microgolf | April 1984 | *2097/100* | | | | |
| Damraiders | May 1984 | *2101/04* | | | | |
| Road Racer | June 1984 | *2105/08* | | | | |
| Doomrun/Backgammon | July 1984 | *2109/12* | | | | |
| Castles of Fear | Aug 1984 | *2113/16* | | | | |
| Villains | Set 1984 | *2117/20* | | | | |
| Hunt the Wampus | Oct 1984 | *2121/24* | | | | |
| Blockbuster/Duel | Nov 1984 | *2125/28* | | | | |
| Painter/Miner<br>+ **Omega Probe** | Dec 1984 | *2129/32* | | | | |
| Rover<br>+ **Galactic Tycoon** | Jan 1985 | *2133/36* | | | | |
| 'Copter Dogfight<br>+ **Atomic Protector** | Feb 1985 | *2137/40* | | | | |
| Astro Mines<br>+ **Flex** | Mar 1985 | *2141/44* | | | | |
| X-15<br>+ **Run Rabbit** | April 1985 | *2145/48* | | | | |
| Stella Rescue | May 1985 | *2149/52* | | | | |
| Othello | June 1985 | *2153/56* | | | | |
| Mutant Fly | July 1985 | *2157/60* | | | | |
| Harbour Command | Aug 1985 | *2161/64* | | | | |
| Ball Lightning | Sept 1985 | *2165/68* | | | | |
| Karate | Oct 1985 | *2169/72* | | | | |
| Whodunnit | Nov 1985 | *2173/76* | | | | |

## *Classic Arcade Games*

| | | | 5¼" disc | | |
|---|---|---|---|---|---|
| | | Tape £5.95 | 40 track £7.95 | 80 track £7.95 | 3" disc £9.95 |
| BBC 'B' | *2246/49* | | | | |
| Electron | *3064* | | | | |

## *Fun School*

| | | | 5¼" disc | | |
|---|---|---|---|---|---|
| | | Tape £4.95 | 40 track £6.95 | 80 track £6.95 | 3" disc £8.95 |
| Under 5's | *2338/41* | | | | |
| Age 5-8 | *2342/45* | | | | |
| Age 8-12 | *2346/49* | | | | |

## *Bibliography*

| | | | |
|---|---|---|---|
| March '83 to Aug '84 5¼" 40T | £7.95 | *2225* | ☐ |
| 3" | £9.95 | *2227* | ☐ |
| Sept '84 to April '85 5¼" 40T | £7.95 | *2298* | ☐ |
| 3" | £9.95 | *2299* | ☐ |
| March '83 to April '85 5¼" 80T | £11.95 | *2226* | ☐ |
| 80 track upgrade | £3.00 | *2301* | ☐ |

## *Communications*

*Overseas/Europe:
Add £7 p&p

| | | |
|---|---|---|
| Pace Autodial/Autoanswer board £57.85 | *2350* | ☐ |
| *Nightingale modem/Commstar £135.95 | *2351* | ☐ |
| Both the above – bundled price £188.80 | *2362* | ☐ |

## *OVERSEAS READERS*

Please add £1 postage per item unless otherwise stated.
All overseas items now sent Air mail. ☐

*Don't forget to fill in your name and address.* **TOTAL**

## You can also order by phone, Prestel or MicroLink/Telecom Gold

- Any of the goods listed here can be ordered by telephone.
- Micronet subscribers and other users of Prestel can also use the Prestel mailbox.
- MicroLink subscribers and other users of Telecom Gold can also use the MicroLink mailbox.

**Tel: 061-480 0171**

**Prestel**
Key Page 89, then send your order to:
**614568383**
24 hours

**MicroLink/Telecom Gold**
**72:MAG001**
24 hours

*Don't forget to quote your credit card number AND your full address.*

Payment: please indicate method (✓)

☐ Access/Mastercharge/Eurocard

☐☐☐☐ ☐☐☐☐ ☐☐☐☐ ☐☐☐☐

☐ Barclaycard/Visa

☐☐☐☐ ☐☐☐ ☐☐☐ ☐☐☐

☐ Cheque/PO made payable to Database Publications Ltd.

BLOCK CAPITALS PLEASE

Name____________________

Address____________________

____________________

____________________

__________ Post Code__________

Signed____________________

*Post to:* **The Micro User,**
**FREEPOST,**
**Europa House,**
**Hazel Grove,**
**Stockport SK7 5NY**

*No stamp needed if posted in UK.*
*Please allow 28 days for delivery.*

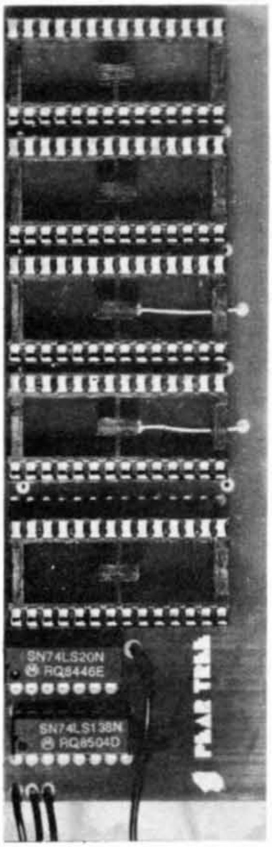
SUPERIOR SOFTWARE LTD
proudly presents

REPTON 2

More Screens,
More Puzzles,
More Adversaries,
More Prizes.
More Than Just a Sequel.

**Release Date: 14th November**

**For more details ring,**
**(0532) 459453.**


SN74LS20N
RQ8446E
SN74LS138N
RQ8504D
PEAR TREE

MR 2000
MINI ROM
BOARD

GIVES 4 EXTRA ROM SOCKETS ON BBC 'B'

PLUG IN – SWITCH ON

MEASURES 128 x 44 mm

FULL INSTRUCTIONS ENCLOSED

ONLY £14.95
inc VAT/P&P

CHEQUE/P.O. PAYABLE TO

PEAR TREE SYSTEMS LTD
PEAR TREE MEADOW
ELLINGTON THORPE
HUNTINGDON CAMBS
PE18 0AW

SEE OUR COLOUR AD
SPECIAL LAUNCH OFFER

POOLSWINNER
THE ULTIMATE POOLS PREDICTION PROGRAM

POOLSWINNER
SELEC

Boxed, with detailed instruction booklet

- **MASSIVE DATABASE** Poolswinner is a sophisticated Pools prediction aid. It comes complete with the largest database available – 22000 matches over 10 years. The database updates automatically as results come in.
- **PREDICTS** Not just SCOREDRAWS, but AWAYS, HOMES and NO SCORES.
- **SUCCESSFUL** SELEC guarantee that Poolswinner performs significantly better than chance.
- **ADAPTABLE** Probabilities are given on every fixture – choose as many selections as you need for your bet. The precise prediction formula can be set by the user – you can develop and test your own unique method.
- **SIMPLE DATA ENTRY** All team names are in the program. Simply type in the reference numbers from the screen. Or use FIXGEN to produce fixture list automatically (see below).
- **DISC/MICRODRIVE COMPATIBLE** Tapes supplied with conversion instructions.
- **PRINTER SUPPORT** Full hard copy printout of data if you have a printer.

AVAILABLE FOR Spectrum (48K), Commodore 64, VIC 20 (+16K), AMSTRAD, BBC B, Atari (48K), ZX81 (16K), Dragon, Apple II, ELECTRON

**PRICE £15.00 (all inclusive)**

NOW AVAILABLE

FIXGEN 85/6 AT LAST: No more struggling for hours to get the fixture list into the computer. FIXGEN has been programmed with all English and Scottish fixtures for 1985/6. Simply type in the date, and the full fixture list is generated in seconds. Fully compatible with Poolswinner.

**POOLSWINNER with FIXGEN £16.50 (all inclusive)**

COURSEWINNER
SELEC

COURSEWINNER V3
THE PUNTERS COMPUTER PROGRAM

**NOT JUST A TIPSTER PROGRAM,** Coursewinner V3 can be used by experts and occasional punters alike.

You can develop and test your own unique winning system by adjusting the analysis formula, or use the program in simple mode. Coursewinner V3 uses statistical analysis of major factors including past form, speed ratings, course statistics, prize money, weight, going, trainer and jockey form etc, etc. It outputs most likely winners, good long odds bets, forecasts, tricasts etc. The database includes vital course statistics for all British courses. You can update the database – never goes out of date.

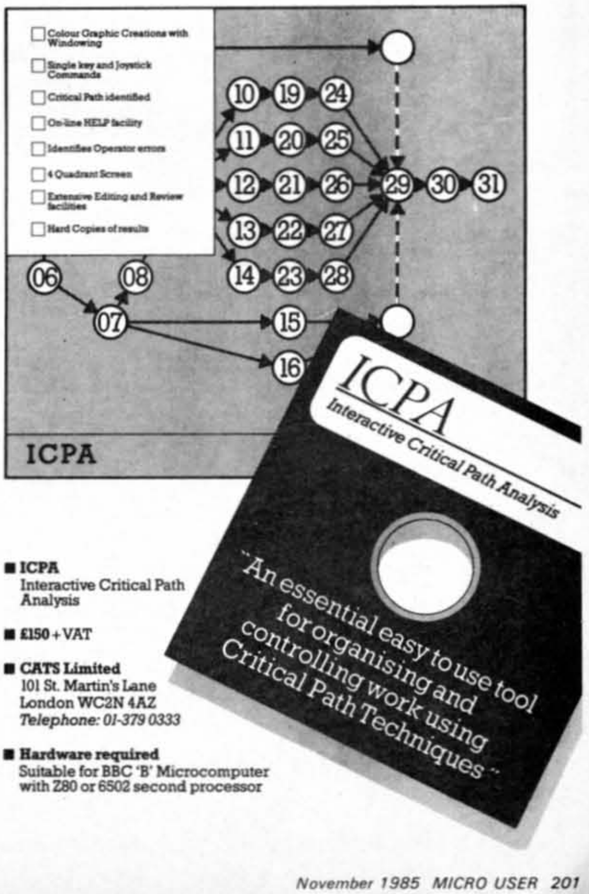
AVAILABLE FOR Spectrum (48K), Commodore 64, BBC (B), AMSTRAD, Atari (48K), Apple II

**PRICE £15.00 (all inclusive) includes Flat AND National Hunt versions.**

Send Cheques/POs for return of post service to . . .

VISA phone 24 hrs
selec SOFTWARE
phone 24 hrs

37 COUNCILLOR LANE, CHEADLE, CHESHIRE. ☎ 061-428 7425
(Send for full list of our software)


☐ Colour Graphic Creations with Windowing
☐ Single key and Joystick Commands
☐ Critical Path identified
☐ On-line HELP facility
☐ Identifies Operator errors
☐ 4 Quadrant Screen
☐ Extensive Editing and Review facilities
☐ Hard Copies of results
06
07
08
10
11
12
13
14
15
16
19
20
21
22
23
24
25
26
27
28
29
30
31
ICPA
ICPA
Interactive Critical Path Analysis
"An essential easy to use tool for organising and controlling work using Critical Path Techniques"

- **ICPA**
  Interactive Critical Path Analysis
- **£150** + VAT
- **CATS Limited**
  101 St. Martin's Lane
  London WC2N 4AZ
  *Telephone: 01-379 0333*
- **Hardware required**
  Suitable for BBC 'B' Microcomputer with Z80 or 6502 second processor

## SAVE BANK CHARGES

Produce your own up-to-date bank statements with program **BANK.** Standing orders entered automatically on correct date and warning given of any due within 7 days. Use either with or without printer, and for as many accounts as you like.

**£12.50**

## ALPHABETIC SORTING

Up to 350 separate items are sorted out with program **ALPHA** and printed in strict alphabetic order. Lists can be updated at any time. Perfect for up-to-date address books, stock inventories, membership lists, class lists, indexes for books and reports, etc.

**£12.50**

*For BBC(B) as (a) tape (b) 40 track disc (c) 80 track disc*
Disc or tape containing both programs: **£20.00**
*Please specify your needs. Cheque with order to:*

**DIAMANT-SOFTWARE**
**7 Goodwood Avenue, Manchester M23 9JQ**
**Tel: 061-962 2708**

## SIMULATION SOFTWARE FOR THE BBC MICRO

| Title | Type | R.R.P. | Our Price! | Title | Type | R.R.P. | Our Price! |
|---|---|---|---|---|---|---|---|
| 3D Bomb Alley | AC | 7.95 | **7.15** | Dambusters | AC | 9.95 | **8.95** |
| 3D Grand Prix | MR | 9.95 | **8.95** | Elite (C) | AC | 14.95 | **13.45** |
| 737 Flight Simulator | FS | 9.95 | **8.95** | Elite (D) | AC | 17.95 | **16.20** |
| 747 Flight Simulator | FS | 8.95 | **8.05** | Heathrow ATC | ATC | 7.95 | **7.15** |
| Air Traffic Control | ATC | 8.00 | **6.90** | Jump Jet | FS | 7.95 | **7.15** |
| Aviator (C) | FS | 14.95 | **13.45** | Red Arrows | FS | 8.95 | **8.05** |
| Aviator (D) | FS | 17.95 | **16.20** | Red Coats | WG | 6.95 | **6.25** |
| Bandits At 3 O'clock | AC | 7.95 | **1.99** | Revs (C) | MR | 14.95 | **13.45** |
| Beachhead | ST | 9.95 | **8.95** | Revs (D) | MR | 17.96 | **16.20** |
| Blitzkrieg | AC | 7.95 | **7.15** | Space Shuttle (C) | FS | 8.00 | **6.90** |
| Combat Lynx | AC | 8.95 | **8.05** | Space Shuttle (D) | FS | 9.95 | **8.95** |
| Copter Capers | AC | 7.95 | **7.15** | Spitfire Simulator | FS | 7.95 | **7.15** |
| Cylon Attack | AC | 7.95 | **7.15** | Stock Car | MR | 7.95 | **7.15** |

**Airborne Software specialises in the very best simulation software at**
**REALISTIC PRICES – INCLUSIVE OF POSTAGE**

FS = Flight Simulation: AC = Arcade Type Simulation: MR = Motor Racing: ATC = Air Traffic Control
ST = Strategic Simulation: WG = Wargame.

All programs are available on cassette unless shown with suffix (D).
Please specify (C) or (D) and your machine when ordering.

Send your cheque/postal order to:

**AIRBORNE SOFTWARE, P.O. BOX 1940, WATFORD WD5 0DL.**

## CROSSWARE CROSS-ASSEMBLERS

HIGH SPEED DISC-TO-DISC ASSEMBLERS
FOR THE FOLLOWING TARGET PROCESSORS:

**6800/6801/6802/6301..6303X,**
**6805/6305/146805**
**6809, Z80, 8080A/8085**
**68000/68008**

Supplied on disc for the stand-alone BBC micro

Phone or write for full details

**CROSSWARE PRODUCTS**

**Melbourn, Royston, Herts SG8 6BA**
**Tel: 0763 60838**

# ADVERTISERS INDEX

Advanced Computer Products 129
Advanced Memory Systems 18, 19
ATPL 152
Airbourne Software 202
Akhter Computer Group 128, 129
Altra Roms 120
Amcom Software 171
Beebug 2
Beebugsoft 124
Bel Tech 50
Bit Twiddlers 148
C&C Co 181
C.F. Terrell 148
Care Electronics 103
Carson Developments 58
CBE Services 162
Chalice 78
Chase Data 12, 13
Chiltern Electronics 151
CJE Micros 53
Clares 140, 141
CMS 98
Collins 181
Comlex 170
Compumart 162
Computer Concepts 16, 17
Crossware Products 202
Cumana 6, 67, 104, 105, 114, 122
Cygnet Electronics 181
Data Store 48
Datapen Microtechnology 155
Datastar Systems 153
DDL 3
Dennison Manufacturing 204
Design Dynamics 48
Diamant-Software 202
Disking 139
Display Electronics 14
Douceware 184
Electronequip 78
Epson 31
Flora Electronics 102
GCC (Cambridge) 182, 183
Griffin Computers 142
High Voltage 134
ICPA 201
IDS Computer Supplies 142
Kosmos 76
Leigh Computer Systems 170
Level 9 Computing 202
Lincoln Microsystems 157
Linear Graphics 179
Martelec 162
Mayday Software 184
Meedmore 159
Merlin Computer Products 74
Micro Power 15
Micro Resources 52
Micro Simplex 160
Microdeal 185
Microdis 133
Microman Computers 165
Micronet 800 86-88
Microtest 130
Microware 116
Microworld Distribution 54, 55
Mighty Micro 184
Minic Business Services 167, 185
Miracle Technology 181
Mirrorsoft 82, 102
Musbury Consultants 148
Mushroom Computers 119
New Information Services 22
Northern Computers 148
Number One Systems 162
Oak Universal 34, 35, 112, 113
Opus 46, 47, 77, 89, 135
P&H Electronics 66
Pace 97
Paean Systems 165
Paul Fray 162
Pear Tree Systems 125, 201
Philips Electronics 95
Printerland 184
Qual-Soft 147
Rombyte 181
S. Hoyle 148
Selec Software 201
Silent Computers 162
Sillicon City 102
Solidisk 7-11
Speedysoft 71
Superior Software 201, 203
Technomatic 59-65
Techmedia Marketing Services 28
Twillstar Computers 32, 33
Viglen 185-190
Vine Micros 96
Voltmace 108
Watford Electronics 36-45
Weserve 105
Wigmore House 148

## THE WORM IN PARADISE

**This is the age of the brain**

**£9.95 on AMSTRAD, ATARI, BBC, CBM, MSX, SPECTRUM etc.**

Available from Level 9 Computing, PO Box 39, Weston-super-Mare, Avon BS24 9UR

**A SPECTACULAR ARCADE-STYLE GAME**

# DeathStar

023400
027400

THE FIRST ZONE.

THE DEATHSTAR BEING BOMBED.

074100
055650

THE WARRIOR ZONE.

CRYSTALS BEING EMITTED FROM A PLANETOID.

## DEATHSTAR

is a fast arcade-style space game with stunning graphics and addictive action. Your "intelligent" opponents, the Workers and Warriors, each have several different tasks to perform: mining the Crystals held deep within the Planetoids, constructing the mighty Deathstar from these Crystals, guarding the Deathstar, attacking your ship, and sacrificially intercepting the Starbombs, with some jobs having higher priorities than others. You must amass a large supply of Starbombs by shooting the Planetoids and collecting the Crystals as they splinter off the Planetoids and hurtle through space. Once the Deathstar has been completed, it comes in rapid pursuit and can only be repulsed by swift and accurate use of the Starbombs. If you successfully destroy the Deathstar, you progress on to the Worker Zone, the Warrior Zone, the Planetoid Zone and the Void Zone (in which there are very few Planetoids present), with a bonus screen between each zone. A superb game, destined to become another Superior classic.

## SPEECH COMPATIBLE

If you have an Acorn Speech Synthesiser fitted, you will hear spoken phrases: such as "BEWARE, I AM COMPLETE" when the Workers have finished building the Deathstar.

**CASSETTE VERSION — £9.95** **BBC DISC VERSION — £11.95**

Due to phenomenal demand, Deathstar is now available on disc for the BBC micro in a high quality vinyl disc wallet with colour packaging.

**WE PAY UP TO 20% ROYALTIES FOR HIGH QUALITY BBC & ELECTRON PROGRAMS**

**SUPERIOR SOFTWARE LTD.**
Dept. MU10, Regent House,
Skinner Lane, Leeds 7.
Tel: 0532 459453.

Access

**OUR GUARANTEE**
- All mail orders are despatched within 24 hours by first-class post.
- Postage and packing is free.
- Faulty cassettes and discs will be replaced immediately.

# BBC MICROS LOVE ELEPHANTS

ELEPHANT
MEMORY
SYSTEMS

ELEPHANT MEMORY SYSTEMS get the best from your BBC Micro. ELEPHANT printer ribbons, head cleaning disks and computer cleaning kits are now added to the ELEPHANT family to provide you with a total computer supplies package. Together with ELEPHANT MEMORY SYSTEMS disks — certified 100% error free and problem free and guaranteed to meet or exceed every industry standard — ELEPHANT is now more than ever the brand to trust.

Dennison

## ELEPHANT NEVER FORGETS

**Dennison Manufacturing Co. Ltd.**
Colonial Way, Watford, Herts WD2 4JY, Tel: Watford (0923) 41244, Telex: 923321

**France:** Soroclass, 45, rue de l'Est - 92100, Boulogne.
Tel. Réseau de Distribution: 605.96.99, Administration des Ventes: 605.70.78, Telex: EMS 206 436 F
**Germany:** Marcom Computerzubehör GmbH, Podbielskistr, 321, 3000 Hannover 51, Tel: (0511) 647420, Telex: 923818
**Italy:** King Mec SPA, Via Regio Parco 108 BIS, 10036 Settimo, Torinese, Tel: (011) 800.93.93, Telex: 211467 KIN MEC-I
**Other Countries:** Dennison International Company, 4006 Erkrath 1, Matthias-Claudius-Strasse 9, Telex: 858 6600